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Paper Industry Experiences Unstable Year

While Pulp and Paper Production Reached New High Levels, the Undertone of the Market Was Weak, Due to Over-Production and Intense Competition — Largest Increases In Output During Past Year Were In Book Paper, Paper Board, and Wrapping Paper Sections—Trend of Employment Downward

Written Especially for the Annual Number of the Paper Trade Journal by H. J. Laughton.

ALTHOUGH, generally speaking, industry and commerce prospered in the United States during the past year, the equilibrium of the paper industry was unstable. While the volume of production of both pulp and paper reached new high levels and showed an increase over the preceding year, the margin of profits was seriously affected, due mainly to over-production in the industry, which resulted in intense competition for orders and considerable price cutting. The record of the past year was all the more disappointing as there is no doubt that, in the main, the paper mills exercised more efficient management and greater economy of production than ever before.

Paper Output Expanding Steadily

The Statistical Department of the American Paper and Pulp Association estimates the total production of paper in 1928 at 10,250,000 tons, an increase of approximately 3 per cent and the total wood pulp production totaled 4,427,000 tons, also an increase of about 3 per cent over 1927. The production capacity of the paper industry in 1928 increased 5 per cent over the 1927 capacity in spite of the fact that in 1927, 23 per cent of the capacity was idle. In 1928 about 25 per cent of the productive capacity was idle and indications are that an even greater percentage is liable to be idle during the coming year.

Largest Increases in Book, Board and Wrapping

The largest increases in production during 1928, were in the book, paper board and wrapping paper divisions. Book paper production, in spite of a 6 per cent increase in 1927, is not quite back to its 1926 level. Board and wrapping, of course, made new high production records in 1928, but both of these groups were subject to rather keen competition and conditions can hardly be called generally satisfactory. These costly competitive methods can be eliminated and these groups can operate profitably, if they cooperate more closely through their group organizations in the elimination of unsound trade practices.

Capacity Continues to Increase

Paper making machinery manufacturers report that 33 new machines with a daily capacity of 1,976 tons were installed in the United States in 1928. These machines represent an increase in capacity for the industry as a whole of 612,000 tons. In addition to this, there were numerous instances of increased capacity by improvements and betterments in existing machines. The increase in capacity may, therefore, be estimated at approximately 700,000 tons. It is estimated that at present about 24 per cent of the capacity of the industry is idle. The capacity of the new machines installed in 1928 is, with the exception of 1929, the largest ever reported.

Employment in the paper industry during 1928 was at a slightly lower level than in 1927. The trend of employment has been downward since the middle of 1928 as a result of more general use of machinery. Employment in the paper industry, however, has been higher than the average for industry in general, according to the Index of Employment of the Department of Labor.

Imports of mechanical sulphite and sulphate pulp increased in 1928 as compared with 1927. In 1928 mechanical pulp imports increased 2 per cent, sulphite 4 per cent and sulphate 10 per cent.

Outlook for Current Year Promising

Some of the more important economic forces which dominate the general business situation or credit conditions, the prospects of foreign trade, the degree of accumulation of merchandise stocks and of speculation in them, the size of the crops and of our current industrial output, and the rate of wages and volume of employment. Commenting on the outlook for 1929, William F. Whiting, Secretary of Commerce, says:

Extraordinary Year in Credit

"With respect to credit conditions, 1928 has been an extraordinary year. The outflow of gold which began in the autumn of 1927 continued during the first half of 1928 and caused a reversal in the easy money situation that had prevailed for several years. Public attention has been fixed on the rise in the rates of stock-exchange ninety-day time loans from 4½ per cent in January to 7½ per cent in the early autumn and the even greater rise in call money rates. It is well, however, to note that bank credit for commercial purposes has been in ample supply at rates ranging from less than one-half per cent higher in southern and western cities to slightly over 1 per cent in New York City, while open-market rates for commercial paper have increased by only 1½ per cent during the year.

"Agricultural output during the past year was about 5 per cent larger than in 1927 and there was an even greater expansion in manufacturing production, but neither stocks of raw materials nor of manufactured goods have shown any general tendency to accumulate. There is no considerable speculation in commodities and wholesale prices average about the same as a year ago.

"Wages continue at a high level and unemployment has been reduced to a minimum. There has been a continued demand for additional workers by mercantile establishments, hotels, and the automotive industry and factories have once more been increasing the number on their payrolls. Labor conflicts in the coal and cotton textile industries were settled during the past year and relations in most sections of the labor world are now amicable.

"Activity in the automotive and construction industries has been sustained and is particularly noteworthy. Automobile production has been at a higher level in recent months than at any earlier period and contracts for future construction have been substantially greater than in the corresponding period a year ago. Production of many related products, such as iron and steel, cement, gasoline, and rubber tires has been stimulated as a result of these developments. The textile and coal industries, however, still lag behind the others.

"Foreign, as well as domestic, demand for the products of our farms and factories is steadily expanding. During the past year there has been an exceptionally large growth of our exports of finished manufactures—especially automobiles, machinery and petroleum products. In general, it may be stated that both industry and trade are exceptionally active as we enter the New Year."

Reckless Competition in News Print

Due mainly to over-development of the news print industry, an unlooked for decline in the normal rate of increase in consumption, and reckless competition for orders, prices declined sharply in the past year. Conferences of the leading executives have been held in Montreal and New York and the manufacturers have agreed to restrict their output to 80 per cent of capacity with the view of stabilizing the industry.

North American news print paper mills manufactured 4,044,000 tons of paper during 1928, an increase of nearly 7 per cent over the preceding year and a new high record, despite the fact that the plants operated at only 83 per cent of capacity, the lowest ratio since 1921.

Canada produced 2,380,000 tons in 1928, an increase of nearly 300,000 tons over 1927, and Newfoundland turned out 230,000 tons, an increase of 28,000 tons. The United States news print plants made 1,415,000 tons, a decrease of 70,000 tons from the previous year.

Although there was a mid-year period of excessively heavy accumulations, these stocks were worked off during the autumn and at the end of the year tonnage at the mills was equivalent to the normal figure of 3½ days production.

Statistics compiled by the News Print Service Bureau show that the capacity of the North American news print industry has doubled in the past ten years and is now 16,000 tons daily, including 10,000 tons in Canada. An additional Canadian capacity of more than 500 tons daily is scheduled to come into operation during the first six months of the current year.

Fine Paper Shows Normal Increase

Great activity characterized the fine paper market during the early months of 1928 and although there was a seasonal recession through the summer there was a satisfactory recovery in the autumn, especially in the higher grades.

While the total volume of business was practically the same as in the preceding year the tonnage of writing paper was approximately 3 per cent higher. Sales of tissue paper were also 3 per cent higher than in 1927. Sales of cover paper, however, declined 5 per cent, due probably to the greater use of heavy weight book papers.

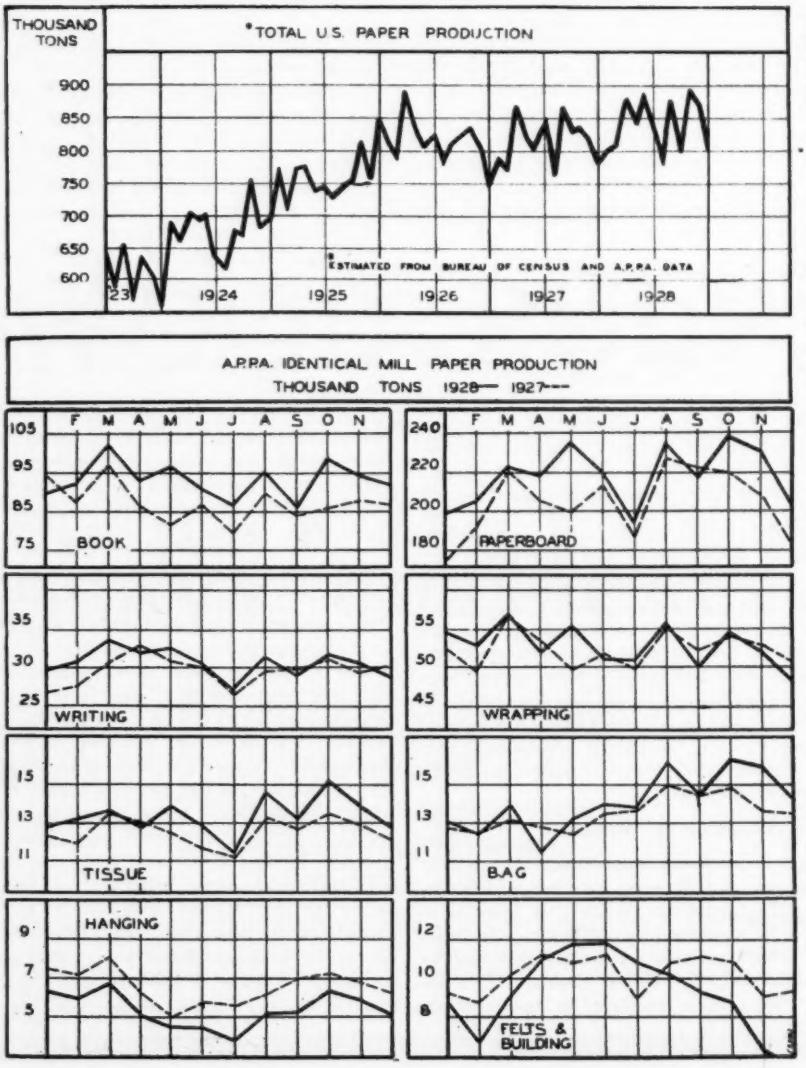
Production of higher grade papers was keyed to demand in a splendid manner throughout the year. Standard mill lines showed continual progress in a year which brought difficulties for other branches of the paper industry.

An increased demand for practically all grades of tissue paper. Many of the larger manufacturers increased their production and operating efficiency with better machinery. This tendency has made it more difficult for some of the smaller mills handicapped with old machinery and high costs.

Business and inquiries coming in to the fine paper mills indicate very good prospects for the first half of the current year. Production and consumption of fine paper in 1929 should show the usual normal increase of from 3 to 5 per cent, judging by optimistic reports from almost every industry in the United States.

Book Paper

Conditions that existed in the book paper industry during the past year were

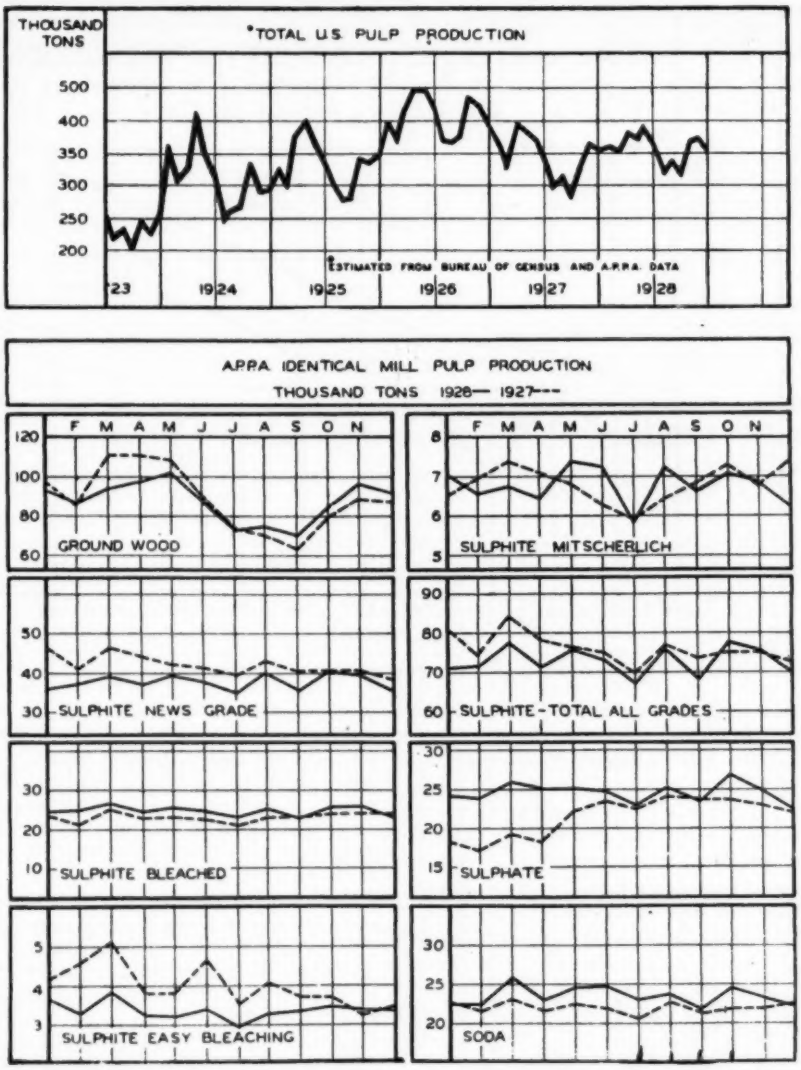


almost identical with the conditions which existed in the preceding year. While the productive capacity of the various mills was increased, the output continued to keep considerably in front of consumption.

Mainly due to this tendency prices on book papers gradually weakened during 1928. Quotations of the leading mills were lowered about $3 per ton early in January and a further reduction of the same figure was recorded around midsummer.

Since the beginning of 1927 ten new Fourdrinier paper machines have been installed by the different book paper organizations, which has increased the capacity to around 5,500 tons per day. The estimated production for the past year was approximately 1,500,000 tons, which was about 80 per cent of the total capacity.

With little prospect of better prices in the near future, however, manufacturers have been discouraged from making further developments and it is anticipated that there will be comparatively few new installations during 1929.



Demand for the different grades of book paper should expand materially during 1929 as it is generally conceded that prevailing business conditions are sound and before the end of the year, with no exceptionally large new developments in sight, consumption should gain on mill capacity, and the book paper industry should become more stabilized than at any time during the past two years.

Overproduction in Coarse Paper

Although consumption of wrapping and other coarse papers showed a normal increase in 1928, production was maintained at too high a volume to permit of satisfactory profits. The wrapping paper mills, running at approximately 80 per cent of rated capacity have not only been able to cope with all demands, but have accumulated stocks.

The output of kraft paper showed considerable expansion and greatly affected the market for wrapping grades other than kraft, including those made from sulphite or ground wood pulps. The low price of news print was also a serious factor, with quotations below production costs of many United States mills, some of which have been seeking a market for sulphite and ground wood wrapping grades. Another important factor in the situation is the growing output of plants situated on or near the Pacific Coast.

Increasing attention is now being paid to the problem of manufacture and distribution. Research departments and laboratories are endeavoring to develop new specialties and grades to take the manufacturer out of the rut of competition. The American Paper and Pulp Association and the newly formed Sulphite Paper Manufacturers' Association are doing what they can to assist the manufacturers to solve the problems which confront them and it is hoped that before long the condition of the industry will begin to improve.

Paper Board

From a volume standpoint the past year was a satisfactory one in the paper board industry, but when viewed from the price level received for the product the year was disappointing. Throughout the year competition was rife and the price average was too low for an adequate return for the efforts expended.

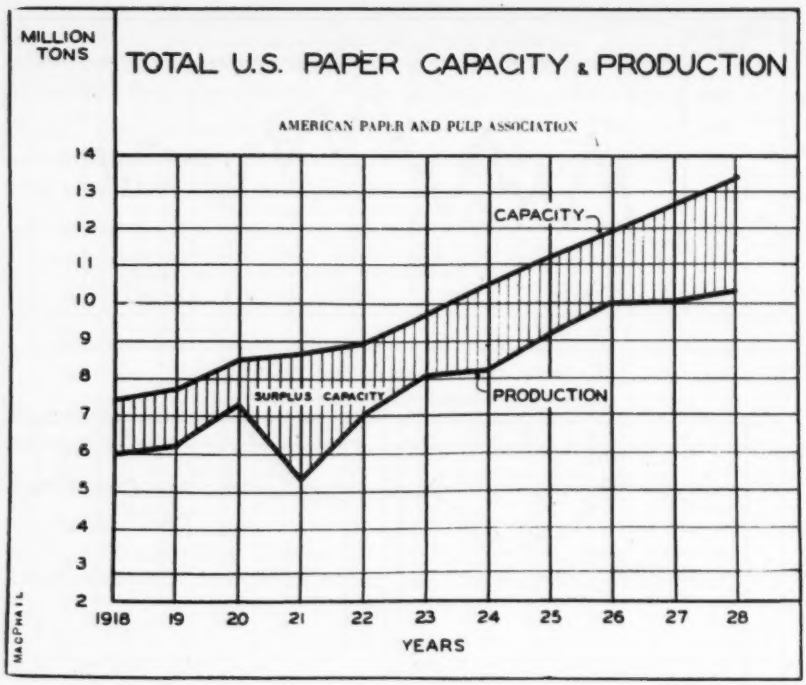
Added pressure has been brought to bear on the box board mills to reduce costs and increase production per hour. Important plant improvements have been effected, with increased speed, better quality and reduced cost as the main purpose. Continuous breaker beaters are replacing the small unit type and more work is being placed on the jordan engines, with corresponding reduction in beater time.

Improvements in corrugated and solid fiber container plants and equipment in 1928 were made to a greater extent than formerly. The sales policy of the container manufacturers did not work out satisfactorily during the past twelve months. Starting with a sales level in January not far from that of the previous year's, a steady decline took place, with the periods of peak production showing no upturn in the prices asked.

In the folding box section, the larger plants that enter into competition for the extra big contracts found a lower level of prices than ever before and more houses bidding for the work. Capacity to produce figured on an eight hour day is far in excess of the demand, but to reduce costs and meet low prices some plants operated two and even three shifts and instructed their salesmen to procure the necessary volume with scant regard for price levels.

Pulp

Marked development of the paper and board industries during the past year was reflected in the pulp market, the outstanding features of which were the stabilization of prices, and the comparitively steady and satisfactory business in chemical pulp. Incidentally, the Northern converting mills had some difficulty in securing pulp at sufficiently low prices to enable them to compete with paper and board mills in the South and on the Pacific Coast, making their own pulp.



There was a decided decrease in the domestic production of mechanical pulp, as well as in the imported tonnage, reflecting clearly the conditions largely brought about through competition with imported news print, and of all the grades of wood pulp, mechanical pulp occupied the weakest position. That there is a substantial over-production of Scandinavian and Canadian ground wood combined is a conceded fact and the unfavorable conditions can be attributed to this situation.

Conditions in the chemical pulp industry during 1928 were quite satisfactory. The business was more stabilized than for several years past and while not particularly brisk during the first quarter of the year, in spite of labor troubles in Sweden, each quarter thereafter showed a gain over the preceding quarter and October and November were record months, both for sales for prompt and forward deliveries.

Paper Stock Prices Higher

The waste paper market was much firmer during 1928 than in the preceding year. Book stock was the bright particular feature. This grade advanced sharply in the first quarter and with the exception of a decline in July, held steadily for the balance of the year. The position of ledgers and writings was not so satisfactory. Mixed papers advanced 100 per cent, news 70 per cent, book stock 80 per cent, containers and prints, 30 per cent, and shavings 25 per cent.

No radical changes were reported in the rag market. While new rags declined during the first nine months of the year, all grades reacted favorably in the final quarter of the year. The improved demand has continued into the new year. Old rags are said to be in a better position than for some time past. Roofing rags were fairly steady and all grades of repacked stock commanded fairly good prices.

Rags have been in better demand abroad than at any time since the war. Incidentally, Belgium is reported to have passed a law that all Government records be printed on rag paper because of the permanency of a rag sheet. This will affect the exportation of rags from that country to some extent.

While gunny fell off slightly during the year, all other grades of bagging remained firm. No. 1 bagging and roofing bagging were particularly consistent. The old rope market was unsatisfactory, although white rope for insulating papers was in heavy request. The ordinary No. 1 grade was not readily-marketed and dropped to pre-war levels.

Chemicals

The consensus of opinion in the chemical industry is that 1928 was an exceptionally good year. The volume of domestic business was greater than ever before, due to increased use of chemicals by various industries, and also to new processes and uses found for many of the staple chemicals. The greatly increased use of chemicals in the paper industry was an important factor in the situation. Incidentally, the progressive spirit shown by the pulp and paper mills in using and perfecting new processes and the general expansion of the industry, has recently called for the erection of several new plants, built especially to take care of the chemical requirements of the paper mills.

Chemicals most widely used in the pulp and paper industry maintained fairly steady price levels during the year, there being few noteworthy price advances and only one or two reductions of consequence. Withdrawals against contract were maintained at a satisfactory pace during the entire year, even in the dull summer months. In the early autumn, price schedules became somewhat firmer and market conditions improved. Contracts for 1929 delivery were generally renewed at practically the same prices that prevailed in 1928.

A feature of the year was the increasing number of mergers and consolidations among the leading manufacturers. It is generally assumed that they will have a stabilizing influence on the market, lessening the tendency to over-production and to serious price cutting. Taking everything into consideration, all indications are that the chemical industry will enjoy continued prosperity during 1929.

GATINEAU POWER DEVELOPMENTS

Gatineau Power Company, Controlled by Canadian Hydro-Electric Corporation, Ltd, a subsidiary of International Paper and Power Company, has started additional generators in its Farmers and Chelsea hydro-electric plants on the Gatineau River, six miles north of the City of Ottawa. The two new generators with a combined capacity of 58,000 horsepower, raise the total installed capacity of the Farmers and Chelsea plants to 232,000 horsepower.

The total capacity of the plants of Gatineau Power Company is now 562,600 horsepower installed and in process of installation, slightly greater than the developed power on the American side of Niagara Falls. Of this, 439,000 horsepower is on the Gatineau River, and the balance, 123,600 horsepower, is in the hydro-electric developments of the Company on the Ottawa River and its other tributaries. In 1928, Gatineau Paper Company produced 1,286,000,000 kilowatt hours of electric energy, two and two-thirds times the output of the company in 1927.

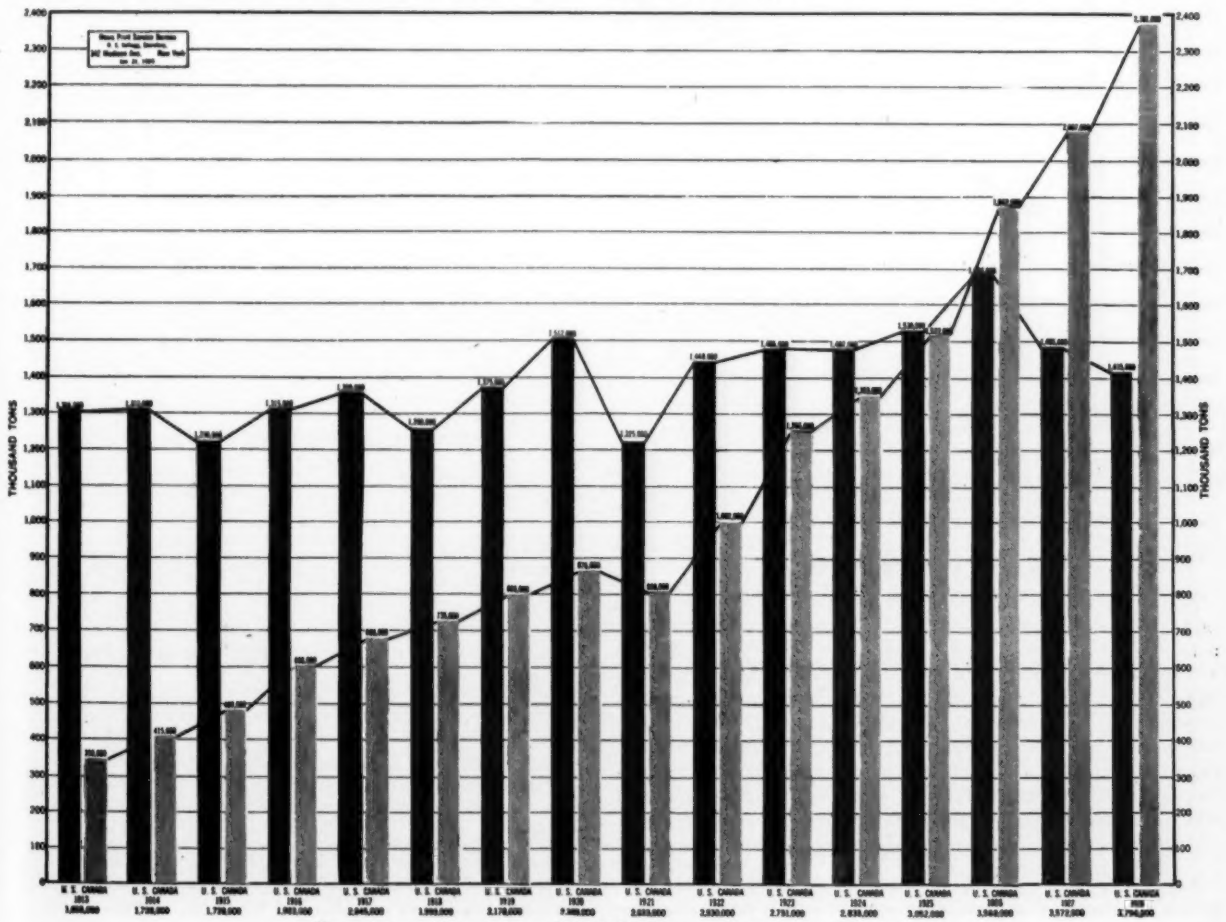
News Print Production Reaches New High Record

Although North American News Print Mills Only Operated At 83 Per Cent of Capacity During 1928, Output Increased Approximately 7 Per Cent Over Preceding Year—Canadian Production Increased Nearly 300,000 Tons But Domestic Output Declined 70,000 Tons From 1927—Consumption In United States Was Around 3,500,000 Tons, Practically the Same As in 1927 and 1926—Capacity Doubled.

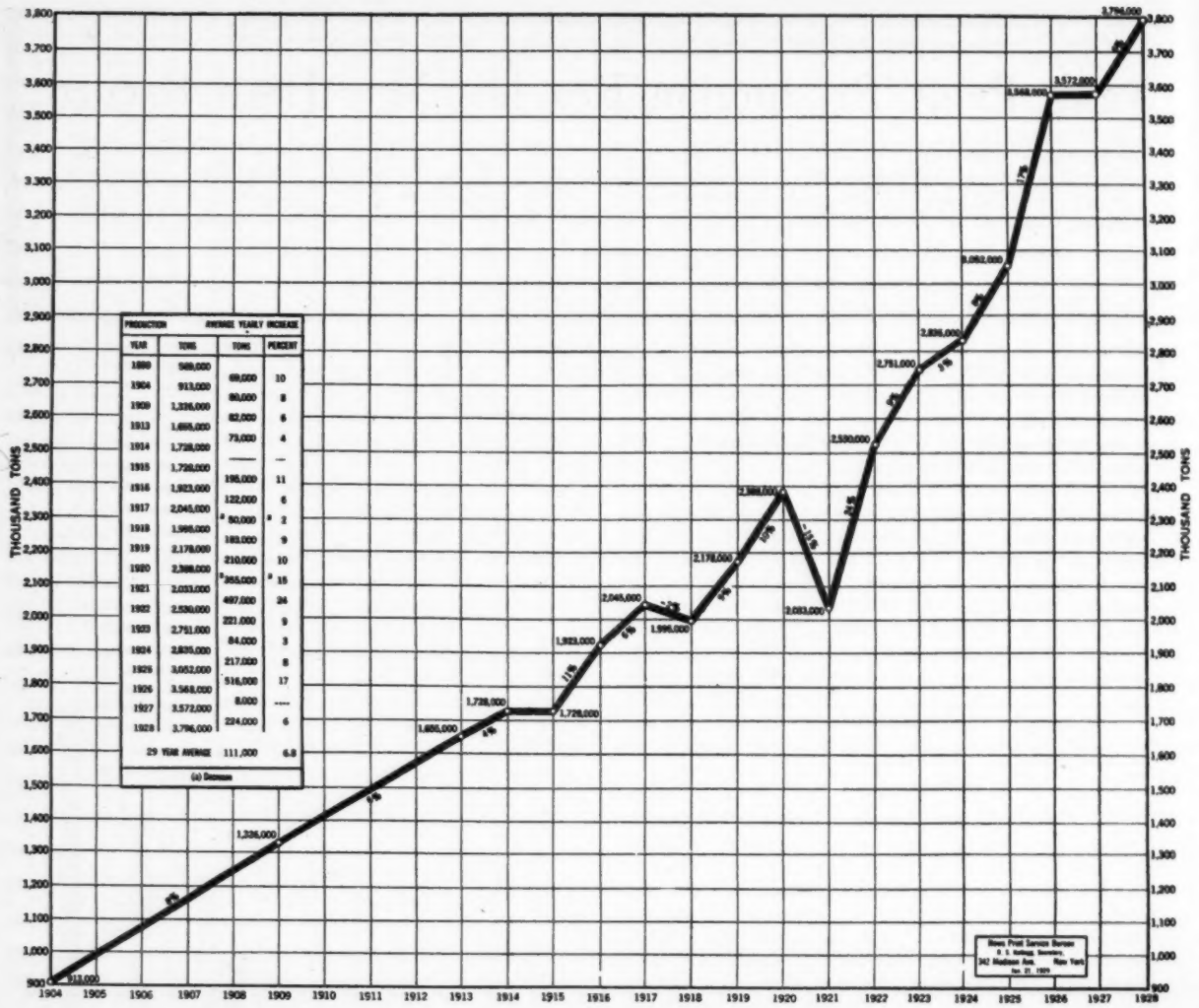
Abstract of Report by R. S. Kellogg, Secretary, at Annual Meeting of News Print Service Bureau.

OPERATING at 83 per cent of rated capacity, which was the lowest ratio since 1921, the North American news print mills made 4,044,000 tons of paper in 1928. This was an increase of nearly 7 per cent over the previous year and equal to 60 per cent of the world production of this essential commodity. With an increase of nearly 300,000 tons over 1927, Canada turned out 2,380,000 tons of news print in 1928, or 59 per cent of the continental total, while Newfoundland's contribution of 230,000 tons was 28,000 tons ahead of the previous year, and the 17,000 tons made and used in Mexico was a 20 per cent increase for that country. Contrasted with new high records in Canada, Newfoundland and Mexico, the 1,415,000 tons of news print made in the United States in 1928 was a decrease of 70,000 tons from the previous year and the smallest production since 1921.

Shipments of paper from the mills during 1928 finally equaled production. There was a midyear period of excessively heavy stocks, but these were worked off during the Fall, so that at the end of the year tonnage at the mills was equivalent to the normal figure of three and one-half days' production. Canadian exports of news print were 92 per cent of production and 82 per cent of these exports went to the United States. On the other hand, Canada sent approximately 275,000 tons of news print overseas in 1928 compared with 133,000 tons in 1927. There was also an overseas export of 98,000 tons of news print from Newfoundland in 1928 and of 11,000 tons from the United States. Offsetting the 116,000 tons of overseas news print which came into the United States last year leaves a net continental balance of about 270,000 tons, or 7 per cent, which was marketed abroad—and this 7 per cent it will be noted, is the same figure as the increase in continental production in 1928.



NEWS PRINT PRODUCTION, 1913-1928, UNITED STATES AND CANADA



Canada's overseas shipments of news print in 1928 went about 45 per cent to Great Britain, about 25 per cent to Australia and New Zealand and nearly as much to the West Indies, Central and South America. News print imports into the United States from abroad came in the proportion of 48 per cent from Sweden, 35 per cent from Finland, 9 per cent from Norway and 8 per cent from Germany. The average importation of overseas news print into the United States for the years 1921-1928 inclusive was 137,000 tons.

Newspaper Advertising Declines

Newspaper advertising in thirty leading cities in 1928 was 2 per cent less in volume than in 1927 and 6 per cent below 1926. The newspapers of 100,000 circulation and over in the United States averaged thirty pages for the daily issues in 1928 as in 1927 and 1926. The Sunday issues, however, were reduced to 104 pages in 1928 compared with 107 pages in 1927, 111 pages in 1926, and 109 pages in 1925. Total English language daily newspaper circulations were reported at 37,973,000 copies for the six months ending September 30, 1928, and at 25,772,000 copies for the Sunday issues, which represented only a slight gain over the same period in 1927.

News Print Consumption Normal

Total news print consumption in the United States in 1928 was in the neighborhood of 3,500,000 tons or 58 pounds per capita, the same as in 1927 and 1926. A consumption of 50 pounds per capita was reached in 1923, and the jump from this figure to 58 pounds per capita in 1926 led some to think that a similar rate of increase would follow 1926. Such, however, has not been the case

Present Capacity 16,000 Tons Daily

The capacity of the North American news print industry has doubled in the past ten years and is now 16,000 tons daily, of which 10,000 tons in Canada.

There is also an additional Canadian capacity in excess of 500 tons daily scheduled to come into operation during the first half of 1929.

CORNER BROOK HOTEL REOPENED

Glynmill Inn—the hotel of International Paper Company at Corner Brook, Newfoundland, which was recently damaged by fire—will open again in two weeks. Although the inn was temporarily closed, only one wing was damaged by fire. Work has commenced on repairs and it is expected that the inn will be completely restored in a month. The loss was fully covered by insurance.

Glynmill Inn is one of the largest hostelries in Newfoundland. It is operated by International Power and Paper Company of Newfoundland, Limited—a subsidiary of International Paper Company—in conjunction with the Corner Brook news print paper mill.

Book Paper Industry Has Disappointing Year

Productive Capacity of Book Paper Mills During 1928 Kept So Far In Front of Consumption That Prices Declined Sharply—Ten New Fourdrinier Paper Machines Have Been Installed by Book Paper Plants Since Beginning of 1927—Comparatively Few New Installations Expected During 1929—With Business Sound and Every Prospect For Increased Demand, Outlook For 1929 Is More Encouraging.

Written Especially for the Annual Number of the Paper Trade Journal

IN reviewing the book paper industry for 1928, the conditions that existed were almost identical with the conditions that existed during 1927. The productive capacity of the various mills manufacturing paper of this grade was increased to some extent so that it continued to keep considerably in front of the consumption.

Estimated Output

In 1927 the production of book paper was approximately 1,400,000 tons, while the mill capacity was 1,850,000 tons, which means there was about 24 per cent idle capacity. The best figures obtainable show the estimated production for 1928 to be 1,500,000 tons, while the productive capacity for the same time was 1,921,000 tons. This means that the operation was only about 80 per cent.

Production Capacity Increased

In 1925 there were eight machines added, with the daily capacity of 335 tons—in 1926, twelve new machines added a daily capacity of 525 tons—in 1927, five new machines were installed with a daily capacity of 195 tons, and in 1928, there were five new machines installed with a daily capacity of 230 tons; a total of 38 new machines added since 1925 with a daily capacity of 1,285 tons. Naturally the productive capacity keeping so far in front of the consumption has meant a weakening in prices.

Price Trend Declined

The prices for book papers were lowered about $3 per ton early in January, 1928, and a further reduction of the same figure about the middle of the year, with some desirable spot orders placed during the year at still lower prices.

We have no definite information as to what new book machines will be added during 1929, but the situation is not the best when the present productive capacity exceeds the consumption by something over 20 per cent.

At the beginning of 1927 there were 232 Fourdrinier paper machines with a capacity of about 5,000 tons per day. Since then there have been ten new Fourdrinier paper machines installed by the different companies, making this grade of paper, which has increased the capacity to about 5,500 tons per day.

Existing Conditions Severe

The severe conditions existing in the industry at the present time, with no prospect of increased prices within the next year, has had a tendency to discourage manufacturers from developing further, and for this reason it is believed that there will be comparatively few new installations during 1929.

Outlook for Current Year Promising

The outlook for the year 1929 in all lines of business seems to be most encouraging. Business conditions generally are on a very sound basis and there is every prospect of a continued increased demand, so with comparatively few new installations, by the end of the year the consumption of paper may have "gained" on the mill capacity and bring forth more stabilized conditions for the future.

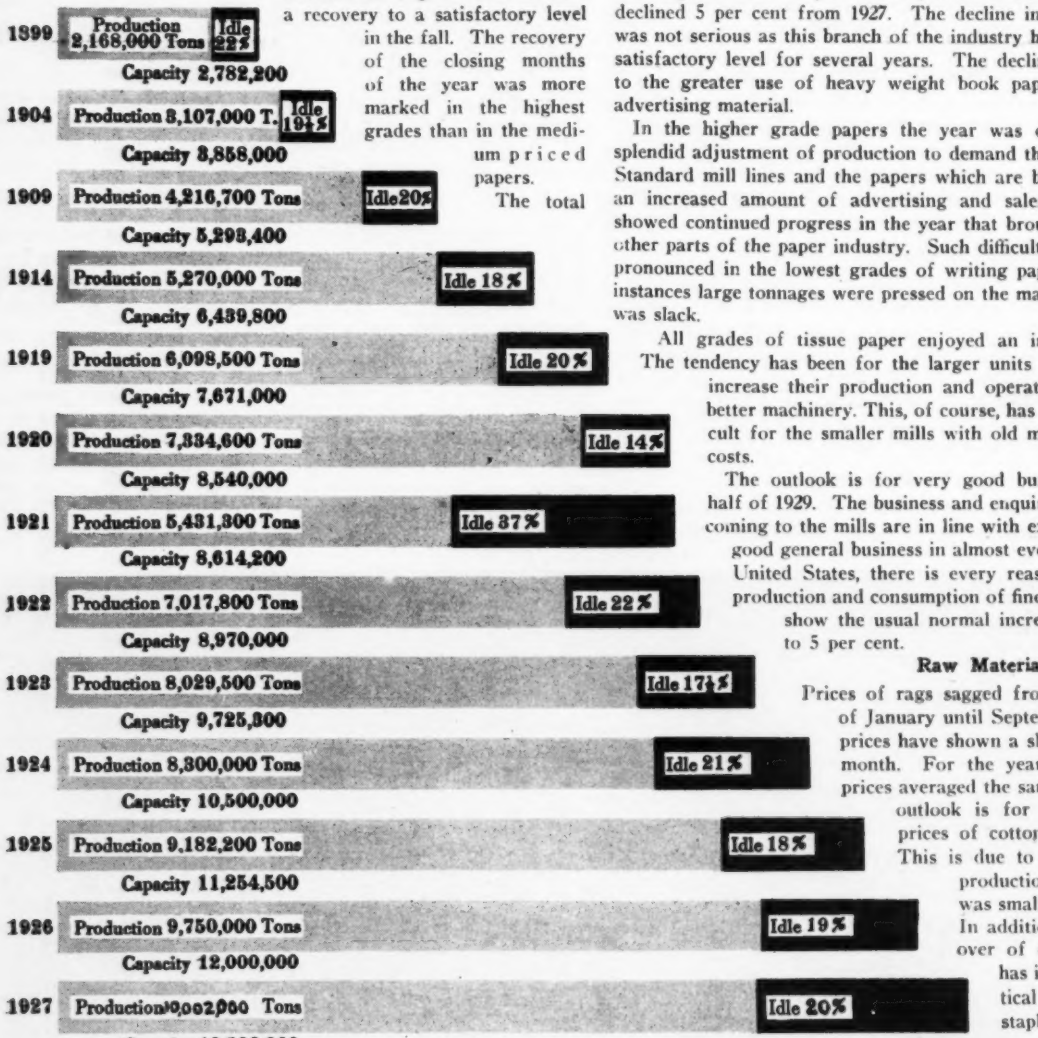
MOSS POINT KRAFT MILL RECENTLY ACQUIRED BY THE INTERNATIONAL PAPER CO.

Fine Paper Industry Has Satisfactory Year

While Conditions Were Almost Identical With the Trend of the Preceding Year, the Early Months of 1928 Were Characterized By Great Activity—Following the Usual Seasonal Recession through Summer, the Market Recovered Its Buoyancy In the Closing Months of the Year—Volume of Writing Paper and Tissues Sold Was 3 Per Cent Higher, Whereas Cover Paper Sales Declined 5 Per Cent — The Outlook.

Written Especially for the Annual Number of the Paper Trade Journal by E. H. Naylor, Sec.-Treas. of the Writing, Cover and Tissue Paper Manufacturers Association.

THE fine paper market for 1928 was almost identical with that of the preceding year. The early months of the year were characterized by a high level of activity with a seasonal recession through the summer and a recovery to a satisfactory level in the fall. The recovery of the closing months of the year was more marked in the highest grades than in the medium priced papers. The total volume of business for 1928 was not materially different from 1927. The tonnage of writing paper was about 3 per cent higher than in the preceding year. Sales of tissue paper were also 3 per cent higher than the year before, whereas sales of cover paper declined 5 per cent from 1927. The decline in cover paper sales was not serious as this branch of the industry has been enjoying a satisfactory level for several years. The decline is probably due to the greater use of heavy weight book papers for covers of advertising material.



CAPACITY AND ACTUAL PRODUCTION OF PAPER MACHINES IN U. S. A.

In the higher grade papers the year was characterized by a splendid adjustment of production to demand throughout the year. Standard mill lines and the papers which are being backed up by an increased amount of advertising and sales promotion work showed continued progress in the year that brought difficulties for other parts of the paper industry. Such difficulties were especially pronounced in the lowest grades of writing paper where in some instances large tonnages were pressed on the market when demand was slack.

All grades of tissue paper enjoyed an increasing demand. The tendency has been for the larger units of the industry to increase their production and operating efficiency with better machinery. This, of course, has made it more difficult for the smaller mills with old machinery and high costs.

The outlook is for very good business in the first half of 1929. The business and enquiries which are now coming to the mills are in line with expectations. With good general business in almost every industry in the United States, there is every reason to expect that production and consumption of fine paper in 1929 will show the usual normal increase of 3 per cent to 5 per cent.

Raw Materials

Prices of rags sagged from the high point of January until September. Since then prices have shown a slight increase each month. For the year as a whole rag prices averaged the same as in 1927. The outlook is for somewhat higher prices of cotton cuttings in 1929. This is due to the fact that the production of cotton goods was smaller than a year ago. In addition, the small carry over of cotton in the bale has improved the statistical position of this staple.

Although this year's cotton crop is about 10 per cent higher than last year, stocks

by next July 31 will be so depleted that it will be necessary to have a still greater crop for 1929-30. If that crop is not well over 15,000,000 bales, the price of cotton next year will be considerably higher than it is at present.

In the pulp market the outstanding features of 1928 were the Swedish strike and the sharp advance in the price of bleached sulphite. The Swedish strike lasted from January 1 to about April 15 and the approximate loss of production was as follows:

Bleached Sulphite	33,000 tons
Unbleached Sulphite	200,000 tons
Kraft	110,000 tons

There have been some recent increases in the capacity of the Swedish pulp industry. With this increased production and with practically no possibility of a strike, production in 1929 should be about 30 per cent higher than 1928.

As a result of the strike, unbleached sulphite rose from $2.10 in January to $2.75 in May, after which prices again declined to about $2.50 at the close of the year. They have since rallied to $2.60 to $2.70.

Despite the large increase in production of bleached sulphite in the United States and in the other countries producing this grade of pulp, consumption has more than kept pace. The very high grades of bleached sulphite have found a new avenue of consumption in the rayon industry which has had a phenominal growth both in this country and abroad.

During 1928 the price of bleached sulphite increased from about $3.40 at the beginning of the year to about $4.00 at the close of the year.

Labor

Labor costs were slightly higher in 1928. Wage rates in the fine paper mills have increased somewhat so that they are now 137 per cent above the pre-war level. There is some agitation for further increase but in view of the general situation in the industry, it is doubtful if any real attempt to seek an increase in wages will be made. Over-expansion of the industry, especially in news print, has caused so much unemployment among the pulp and paper mill workers that employees will probably be glad to secure a renewal of the present wage rates.

New Machines

Reports received from paper-making machinery manufacturers indicate that 33 new machines with a daily capacity of 1,976 tons were installed in the United States in 1928. These machines represent an increase in capacity for the industry as a whole of 612,000 tons. In addition to this, there were numerous increases in capacity by improvements and betterments in existing machines. The increase in capacity for 1928 may, therefore, be estimated at approximately 750,000 tons.

From reports at hand, the total volume of production for 1928 seems to be only 2 per cent ahead of 1927, so that at present 23 per cent of the capacity of the industry is idle. The capacity of the new machines installed in 1928 is, with the exception of 1920, the largest ever reported.

Analysis of Machines

During 1928, six new writing machines were installed. Of these, three with a daily capacity of 195 tons were for low grade sulphite bond, two with a daily capacity of 24 tons were for rag content papers, and one machine was for light weight writings. This appears to be the largest increase in writing paper capacity in any single year on record. In addition, three new machines are contemplated for 1929.

The extensive building in the last few years in the book branch of the industry has been somewhat moderated, but still appears to be far above consumption requirements. Five new machines with a daily capacity of 230 tons were intsalled in 1928. One new machine with a daily capacity of 25 tons has been ordered for 1929.

Two new large tissue machines were installed last year—one for waxing papers and one for toilet papers. A new machine for making towelling papers is on order for delivery in 1929.

Conversion of some news print capacity to other lines of paper will probably bring increased production and keener competition in the grades affected.

The consumption of paper in the United States has continued to show a small steady increase, but capacity has been increased at a rate far in excess of consumption requirements. As a consequence, the spread between capacity and production continues to widen in practically all grades. Unless consumption should expand to some unexpected degree—which at present does not seem likely—the probabilities are that business conditions in the paper industry will become worse and competition keener. In recent months the news print situation has awakened the industry to the grave condition that can be created so quickly by over-expansion. It is expected and hoped that installation of new machines will hereafter be more in line with the consumption requirements of the country.

DECEMBER PAPER PRODUCTION

The total paper production in December, according to identical mill reports to the American Paper and Pulp Association, was 546,620 tons as compared with 599,311 tons in November and 617,391 tons in October. The twelve months' production total for 1928 was 6,965,951 tons against 6,762,942 tons in 1927, an increase of 3 per cent.

Production in all grades with the exception of newsprint, hanging and felts and building papers showed an increase in 1928 as against 1927. Book and paperboard showed an increase of 6 per cent over 1927 production, while total wrapping increased 1 per cent, tissue 5 per cent, bag 4 per cent and writing 3 per cent. The following grades registered production losses in 1928 as against 1927; hanging, 18 per cent; felts and building, 9 per cent; news print, 5 per cent.

The shipments of paper in 1927 exceeded those of 1928 in all grades except news print, hanging and felts and building while production in the various grades increased enough to exceed the shipments in all cases.

Stocks on hand at the end of December, 1928, increased 12 per cent above those at the end of December, 1927, while December stocks were 3 per cent over those existing at the end of November, 1928.

While 1928 paper production increased approximately 3 per cent over 1928, the productive capacity of the industry increased about 6 per cent. This increase was in the face of an existence of idle capacity amounting to approximately one-quarter of the total productive capacity.

Identical pulp mill production reports to the American Paper and Pulp Association for 1928 showed little change from the 1927 level. December, 1928, production totaled 203,712 tons against 219,771 tons in November and 214,347 tons in October. Stocks on hand at the end of the year showed a decrease as compared with the same period in 1927 for groundwood, sulphite total and sulphate.

COMPARATIVE REPORT OF PAPER OPERATIONS IN IDENTICAL MILLS FOR THE MONTH OF DECEMBER, 1928

Grade	Production tons	Shipments tons	Stocks on hand end of month tons
News print	115,049	115,033	34,469
Book	91,336	91,354	54,320
Paper board	201,535	193,007	55,465
Wrapping	48,203	47,645	54,633
Bag	14,013	12,839	6,629
Writing	28,210	27,196	44,644
Tissue	12,695	12,182	11,207
Hanging	5,196	5,300	2,870
Felts and building	5,326	4,842	3,235
Other grades	25,057	25,938	17,977
Total—All grades	546,620	535,336	285,449

COMPARATIVE REPORT OF WOOD PULP OPERATIONS IN IDENTICAL MILLS FOR THE MONTH OF DECEMBER, 1928

Grade	Production tons	Used during month tons	Shipped during month tons	Stocks on hand end of month tons
Ground wood	90,190	83,371	3,015	82,342
Sulphite news grade	35,535	32,686	2,739	9,310
Sulphite bleached	22,961	20,793	2,117	2,709
Sulphite easy bleaching	3,363	3,165	283	570
Sulphite Mitscherlich	6,257	5,169	917	1,626
Sulphate pulp	22,988	17,903	5,184	4,317
Soda pulp	22,398	14,593	8,007	5,603
Pulp—Other grades	20	.....	19	23
Total—All grades	203,712	177,680	22,281	106,500

1928!! Coarse Papers 1929??

Except for Normal Increase, Consumption of Wrapping and Other Coarse Papers During 1928 Was Little Changed From Previous Year—Increased Production of Wrapping Paper, However, Seriously Affected the Market for Papers Made From Sulphite or Ground Wood Pulps, or Both—Decline in News Print Prices Was Another Disturbing Factor in General Situation—Output of Pacific Coast Mills Increasing Rapidly.

Written Especially for the Annual Number of the Paper Trade Journal by Arthur N. Waring, Mgr. of Sales, Bayless Mfg. Corp.; Dist. Rep. Fletcher Paper Co., and Port Huron Sulphite & Paper Co.

OUR daily newspapers, magazines, trade reviews and financial surveys have emphasized in our minds that general business in the United States is in a tremendously prosperous condition. Record sales are recorded by large corporations. Bank clearings, merchandise car loadings, building operations, and stock market turn over all point to the truth of the assertion that business as a whole is breaking all records and is likely to continue at this top speed for some time to come.

It seems proper, therefore, for those of us engaged in the manufacture and distribution of coarse papers to audit closely our particular division of the general business field and determine whether we are sharing as we should this general prosperity.

The consumption of wrapping and other coarse papers during 1928 based on the best estimates obtainable, was changed but little from the previous year except for the normal annual increase.

Running at the rate of about 80 per cent of rated capacity the wrapping paper mills during the year have been not only able to supply the demand but have accumulated stocks.

Both classes of buyers, merchants and converters, have followed a hand-to-mouth policy so far as their purchases are concerned. This is due to the quick service obtainable from the mills, easy transportation and to fear of price declines—in short to over production. Of this no secret is made—in fact there are few secrets in business in these enlightened times.

Below is given an interesting table (figures estimated) of wrapping paper production for the past four years:

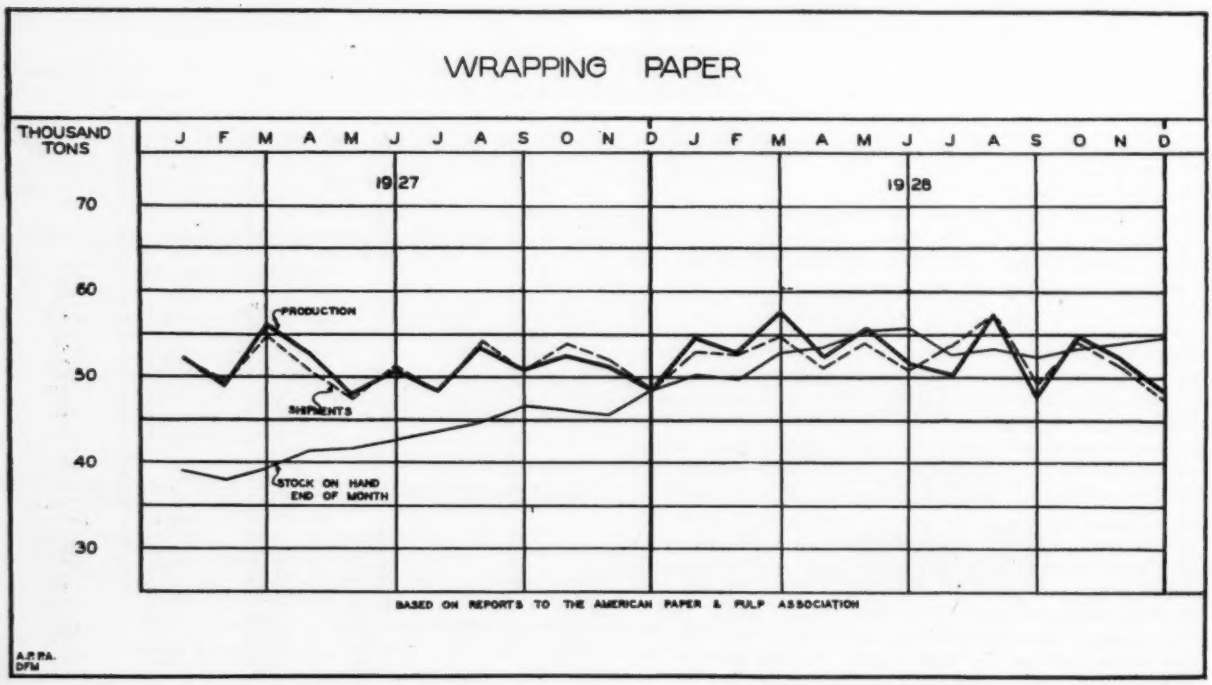
	Total wrapping production tons	Sulphite wrapping production tons	Total kraft production tons	Southern kraft production tons
**1925	1,292,000	812,000	480,000	*120,000
*1926	1,450,000	884,000	566,000	*175,000
**1927	1,525,000	888,000	637,000	242,000
*1928	1,600,000	860,000	740,000	*286,000

* Bureau Census.
** American Paper and Pulp Association.

From a glance at the above figures it is quite evident that the increased production of kraft paper has greatly affected the market for wrapping grades other than kraft, namely, those made from sulphite or ground wood pulps or both.

Another factor seriously disturbing the wrapping paper field is the low prevailing price of news print which is below the production cost of many mills in the United States, who are not so fortunately situated from the standpoint of natural resources and operating costs as are many of the larger and more recently built news print mills in this country and in Canada. These mills just referred to should analyze the true picture of the situation before seeking a market for sulphite and ground wood wrapping grades, the market for which is already over crowded with actual and rated production more than ample to supply present needs.

A very important additional factor which has been developing



during the past year or more is the rapidly increasing production of mills located on or near the Pacific Coast. These manufacturers with low operating costs and competitive freight rates to Atlantic Seaboard points are forced to seek an outlet for their product in the thickly populated Eastern market.

It is said in some instances that the sales activities of the Pacific Coaset mills bring them into the Eastern markets with a disregard or, or without complete knowledge of the trade customs, upcharges and differentials covering special packing among Eastern manufacturers, which if true is a hardship and an additional burden upon the Eastern and Central Western manufacturers of wrapping papers. This condition, whether alleged or real, can be corrected by a closer cooperation through trade association work.

Wrapping Paper Imports

Below are given some interesting figures on the tonnage of imported wrapping papers during the last six years:

*1923.....	44,006 tons	*1926.....	8,325 tons
*1924.....	24,825 tons	*1927.....	13,367 tons
*1925.....	9,985 tons	*1928.....	16,040 tons

* American Paper and Pulp Association.

The reduction of tonnage of wrapping paper imported which took place in the year 1925 was due to the efficient work of the Import Committee of the Paper Industry under the direction of its manager, Warren B. Bullock. This committee should be supported morally and financially by every manufacturer of paper in the country.

Hearings before the Congressional Committees are now being held in preparation for the new tariff bill to come before the special session of Congress this spring.

Problem of Manufacture and Distribution

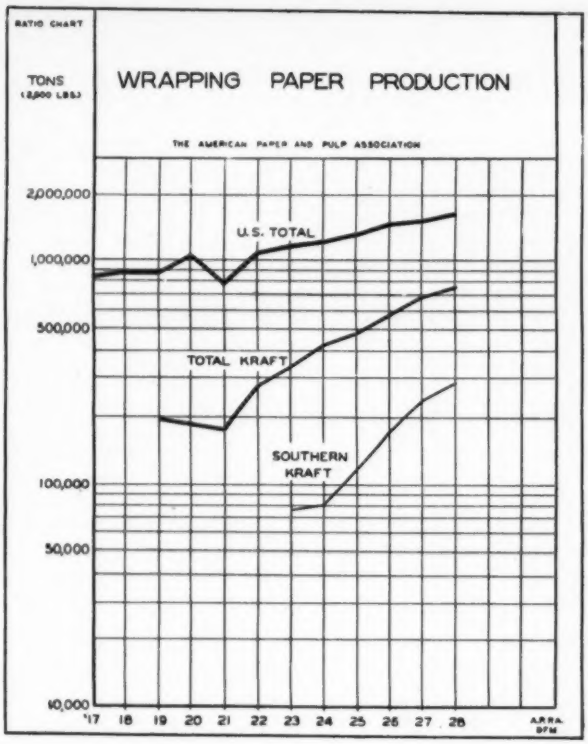
This picture of the wrapping paper industry is not a pleasing or optimistic one. It is a problem not alone of manufacture but of distribution and increasing attention is being paid to the problem from that standpoint. Many manufacturers who in the past have spent large sums of money for maintenance, for factory improvement and for turning out increased tonnage are now realizing that resistance to sales is increasing, that their sales end must be made more efficient and that appropriations must be increased both for sales activity and for advertising.

Research departments and laboratories are working overtime to develop specialties and new grades which will take the manufacturer out of the rut of competition.

The manufacturers' associations in various branches of the industry are rapidly making their work more comprehensive and are extending this membership to all manufacturers in each line whether located on the Pacific or Atlantic Coasts or in territory between the two.

Purpose of New Association

The manufacturers of papers made from sulphite or ground wood or both whose mills are located largely in the Central Western, Middle Atlantic and New England States have formed a new trade association called the National Sulphite Paper Manufacturers' Association, whose headquarters are in the Conway Building, Chicago. This association has for its main purpose the placing before its membership, which already comprises a large percentage of the manufacturers of sulphite and mechanical pulp grades, a true picture of the condition of the industry.



Through the cooperation of the American Pulp and Paper Association, statistics, itemized as to grades, are compiled and distributed giving in detail full information as to production, stocks on hand, orders received and shipments made, without which information no manufacturer whether located in the West or East, can with complete intelligence conduct his business.

Sane Management Necessary

Sane management was never the vital necessity it is today. What manufacturer is there who would not prefer to make 1,000 tons per month to obtain $100,000 per month of sales at a selling price of $100 per ton, to running 1,200 tons to obtain the same gross sales at $83.33 per ton?

The problem will be solved by the sound common sense of the men engaged in the paper manufacturing industry and whether it will be done by mergers and centralized management, by consolidated and cooperative selling departments, the distributing of true information by trade associations to their memberships, or by many other suggested remedies, remains to be seen.

SULPHITE PULPING COURSES

The short course of instruction in the sulphite pulping of wood, which was presented twice at the Forest Products Laboratory at Madison, Wis., in the spring of 1927, will be given again March 25 to April 6 next, according to an announcement from C. P. Winslow, director of the laboratory. As in previous courses the enrollment will be limited to fifteen men. Vance P. Edwardes, who was in charge of the 1927 courses, will again direct the lectures and demonstrations.

A special feature of the coming course will be demonstrations of the pulping of eastern hemlock by the sulphite process, and of hardwoods by both the sulphite and semi-sulphite processes.

The sulphite courses given at the Forest Products Laboratory are adapted to the needs of sulphite superintendents and tour bosses. Twenty-eight men, principally mill superintendents, attended the 1927 courses. Many of the men came from Canadian mills and one representative made the trip from Newfoundland.

The sulphite courses are based on the results of research on which thousands of dollars of federal funds have been expended. During the progress of the courses the entire physical equipment and personnel of the pulp and paper section of the laboratory is at the disposal of the short course men.

Owing to the fact that no Forest Service funds are allotted to instructional work a cooperative fee of $200 is required of each man enrolling in the courses.

This amount represents only the cooperator's share of immediate costs incurred during the progress of the courses and the preparation of the lectures and demonstrations.

Applications for enrollment in the March 25 course should be addressed to the Director, Forest Products Laboratory, Madison, Wis.

Paper Board Industry Has Unfavorable Year

Mills Have Been Operated Very Efficiently But the Sales Policy in Determining Prices of Box Board During 1928 Has Been an Outstanding Failure—Competition Throughout Year Was Based Largely on Desire for Volume With Prices as a Secondary Consideration—Fall Brought a Record Breaking Tonnage But Caused No Upturn in Sales Averages and the Year Closed With Many Board Plants Showing a Net Loss.

Written Especially for the Annual Number of the Paper Trade Journal by Grafton Whiting, Statistician of the Paper Board Industries Association.

CONDITIONS during 1928 in the paper board industry must be recorded as favorable from a volume standpoint, but unfavorable when viewed from the price level received for the product. Keen competition has ruled throughout the year, the last quarter establishing a new record for volume but with the price average far too low for an adequate return on the investment and effort expended.

Recent prosperity in many industries has been based on mass production which is predicated upon the continuous flow of a like product through successive operations. The paper board industry has been misled by the belief that a large volume of orders was the equivalent of mass production and have failed to reckon the cost of frequent changes in grades, sizes and special requirements of customers. Paper board and its fabricated products is, of necessity, manufactured to comply with customers' specified instructions and where buyers refuse to anticipate their wants except for short periods ahead, volume can be obtained only by an accumulation of small dissimilar units.

The effect upon the cost of production of this hand-to-mouth buying, with its demand for quicker deliveries and greater service, has not been recognized in the price asked. The rush to accumulate a large volume of sales has resulted in the acceptance of many small orders at the unit price formerly demanded for longer runs.

Paper board is a general term used to designate a material composed of wood or other fibers matted together in a paper machine and built up to 12 points (12/1,000th of an inch) or more in thickness. The demand for this product comes largely from fabricators of fiber shipping containers, folding box manufacturers, and makers of set-up or noncollapsible boxes, so the expression "box board" is commonly applied to this branch of the industry. The tonnage made of box board and the value of the output in the United States is greater than that of any other of the paper making divisions.

The compilation of statistics has been carried on for a number of years through a series of weekly and monthly reports from makers of box board, containers and folding boxes. In each of the three groups, there is included a preponderance of the total tonnage output sufficient to assure correct representation of the industry as a whole.

With uniformity and continuity of reporting there has been built up a background of past performance so that one year may be compared with another, and by analysis, a forecast can be made of what may be logically expected in the future. A forecast of this character is illustrated by Chart 1 where the forecast or normal line (solid line) predicts the activity month by month throughout the year. As the actual operating time is computed it is superimposed on the chart (broken line). The accuracy with which the forecast predicted the activity during 1928 can be judged by the illustration.

The purpose of such a display is similar to that of preparing a budget or setting standards of performance of a plant's activity and contrasting each period's accomplishment with the predetermined figure. A difference, however, arises from the fact that control of activity does not rest in the hands of one or two executives but is a composite of the operating policy in many plants. With this in mind charts are issued similar to those illustrated and manufacturers are encouraged to plot on them their own lines to provide direct comparison between their running schedules and that of the industry as a whole. With this relationship established the activity of any plant is more readily kept in harmony with the existing conditions.

Of the three groups the mills produce most of the raw material used by the container and folding box groups. Although the ultimate consumer, the buyer of boxes, regulates the demand, each of the three groups has its own problems and its own need for answering them. In reviewing the conditions that existed during 1928, the three divisions are treated separately.

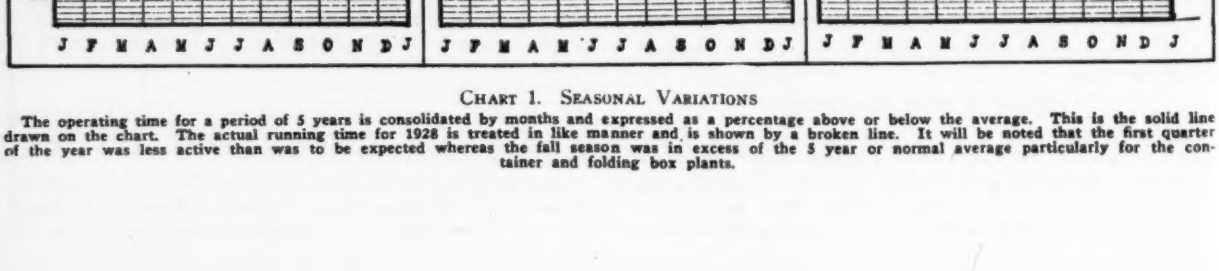


CHART 1. SEASONAL VARIATIONS

The operating time for a period of 5 years is consolidated by months and expressed as a percentage above or below the average. This is the solid line drawn on the chart. The actual running time for 1928 is treated in like manner and is shown by a broken line. It will be noted that the first quarter of the year was less active than was to be expected whereas the fall season was in excess of the 5 year or normal average particularly for the container and folding box plants.

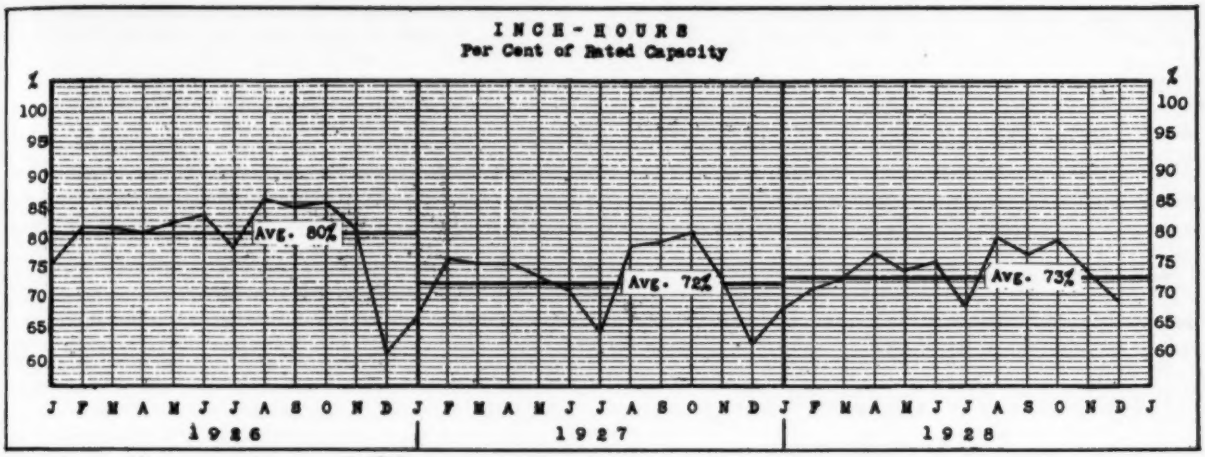


CHART 2. BOXBOARD MILL OPERATIONS

The rated capacity in inch hours is found by multiplying the trim width of the machine by 144 hours to give the total inch hours per week here consolidated by months. This figure is divided into the actual inch hours run and the result stated as a percentage. The percentages and yearly averages are here plotted for the past three years.

Boxboard Mill Group

The low range of prices coupled with large volume output has brought added pressure on the mills to reduce costs and increase production per hour.

PLANT IMPROVEMENT

Continual activity has been noted in plant improvements during 1928, with increased speed, better quality, and reduced cost as the main purpose. Continuous breaker beaters are replacing the small unit type; and more work is being placed on the jordan engines with corresponding reduction in beater time. The buildings in which paper machines are housed have been lengthened to permit the installation of more driers and the roofs raised to accommodate modern ventilation systems. Electric signals and recording devices are being introduced to assist in governing the regularity of the output and maintaining the speed per hour.

In the power plant, electro-turbine generators continue to replace the steam engines, and new high pressure boilers equipped with automatic stokers and coal conveyors are reducing power costs.

OPERATION

Box board mill operations have been handicapped by the hand-to-mouth buying policy which has reduced the average volume of orders on hand to run and has necessitated frequent changes of the grades of board made. Using the expression "days to run" as indicating the volume of orders on hand, 1926 showed an average of 12 days; 1927, 11.1 days; and 1928, 8.2 days. With a small volume of orders to select from efficient planning becomes an involved task, the maintenance of average speed is difficult to hold, and the percentage of waste and spoilage increases.

In spite of these handicaps the average tons per hour of a 100-inch trim machine improved from 2.82 tons in 1927 to 2.95 in 1928; a gain of 4.6 per cent. Reports of mill activity are recorded in inch hours (trim width of machine multiplied by hours operated), and by contrasting these figures with the possible inch hours (trim width multiplied by 144 hours per week) an expression is obtained in a percentage of actual to possible. Chart 2 represents this percentage, accumulated by months, and shows the seasonal trend and also the average running time for the year. This is not a volume chart being a statement of time, but if the average tons per hour mentioned above were applied it would give a general picture of the relative volume output.

It will be noted that the curve for 1928 on Chart 2 is the same as that of the broken line on Chart 1 for the mills, and this trend is emphasized in the statistical displays because of its importance in governing the periods of expansion and curtailment of running time.

The temptation is to postpone any reduction of activity, to exhaust all orders on hand, and even to seek additional tonnage wherever it may be found. Such a policy leads to overproduction and demoralizes the market. To balance production with the demand and to be governed by a knowledge of the conditions in the industry is the logical course to pursue. The success with which these conditions have been met during the past three years is illustrated by Chart 3, where the demand is here termed "orders" (broken line), and the supply marked "production" (solid line). The space between the two is filled in with black where production is in excess of orders and in white where the reverse is found. The year 1928 has less extent of filled in area than either 1926 or 1927 and is indicative of the fact that better control was exercised.

Chart 3 shows the gains and losses drawn in bar form, as it is difficult to gauge the amount of change by judging areas. The bars extending below the horizontal line "O" are those that give most concern since they indicate operations in excess of incoming orders.

COSTS

Conversion costs in box board mills have been the subject of considerable study during the year just past. The labor of handling raw and finished material was found excessive in some plants and cost reduction was obtained by the installation of mechanical conveyors and electrically driven mill trucks, etc. The largest item of cost outside of raw materials is that for power and heat which compose about 30 per cent of the total conversion cost. When it is realized that in some mills for each ton of board made there is required 15,000 pounds of steam to pump 60 tons of water to develop 550 mechanical horsepower to supply hot water and to heat the driers on the paper machine, an efficient steam and power plant must be acknowledged as being of prime importance.

For the accountant it is not difficult to determine the cost per 1,000 pounds of live steam, but its utilization is more complicated. Live steam is used by the prime movers, turbines or engines; by the boiler room auxiliaries, for heating in the beaters; and for maintaining pressure on the driers. Exhaust steam from the prime movers is used in the driers; for heating boiler feed water; for heating the building, etc. The proportionate part of the original steam cost that is chargeable against each operation is not readily obtained, but is essential in any program of cost reduction. During the past year a study was made of steam and power cost in box board mills and a practical method of computation and distribution was evolved.

SALES POLICY

As stated above the sales policy in determining prices of box

board during 1928 has been an outstanding failure. With the price level fairly well stabilized during 1927 and at the opening of 1928 an almost continuous decline lasted until July when a figure was reached that left no profit in sales except for a slight margin in the most efficient plants. The fall increase in volume—a record breaking tonnage—caused no upturn in the sales averages, and the year closed with many plants showing a net loss.

Competition throughout the year was based largely on desire for volume with price as a secondary consideration. Where orders could not be found for the usual box board output, specialties were sought until this field was also demoralized with but a temporary gain in tonnage for the box board mills.

When a situation of this kind exists at the close of a year, it requires a considerable time for recovery to take place. Contracts for the first part of the coming year are entered into in January. Some, to be sure, are short time agreements but others run from three to six months in advance and with prices quoted at extremely low levels, there is built up a strong resistance to any advance.

Container Group

The term "Container" is used to designate corrugated and solid fiber boxes such as are commonly used for shipments by freight, express or parcel post. The corrugated box is made from a sheet composed of two layers of box board held together by an inner section of fluted straw board. The solid fiber box is cut from a lammated sheet of three or more plies of box board pasted together. Both types of boxes are widely used and are in competition with each other for certain classes of shipments.

Corrugated

Improvement in plants and equipment in 1928 were made to a greater extent than formerly and many projected changes are scheduled for 1929. The old construction of factory buildings has been found inadequate for housing the new machinery necessary for present day competition. New buildings with unobstructed floor space and ample overhead room have been erected where machinery of recent model can be installed upon firm foundations. A few years ago, a 63 inch wide corrugating machine 50 to 60 feet in length producing 100 lineal feet per minute was considered most efficient. Today some of these machines are over 100 feet long, 74 inches wide, and are advertised to run 300 feet per minute. New and faster running box making machinery has come on to the market, and in some of these two operations, formerly necessitating separate units, are performed in one revolution of the machine.

Operating

Although the gauge of the speed on the corrugators is expressed in lineal feet the true indication of the output is the square feet made. The production of the corrugators regulates the volume that passes through the plant since the complement of the box making machinery is usually ample to take care of all the combined board delivered by the corrugators. In 1928 the output per hour averaged 18,634 square feet and represents an increase over 1927 of 7 per cent; contrasted with 1920, it was 57 per cent greater. The introduction of wider and faster running machines in replacing the older types is responsible for the major portion of the increase, but the stress of competition has forced executives to pay closer attention to all elements in production, and efficiency in operation of machinery has been an item of investigation.

The demand for corrugated boxes is governed by the requirements of shippers in the many industries whose products are packed in fiber containers. This results in a seasonal fluctuation in volume which in turn lengthens or shortens the hours of operation in the box plant. Chart 5 illustrates these changes and shows by months the per cent of normal running time during the past three years. The early spring and fall months are those of greatest activity with March and October representing the peak periods. The year 1928 averaged in activity 76.7 per cent, approximately the same as in 1927. By adding this to the increased output per hour mentioned above, it will be seen that 6.3 per cent increase in the total volume of production was experienced over that of the previous year.

Sales Policy

As in the mill group, the sales policy of the container manufacturers has been a failure. Starting with a sales level in January not far from that of previous years a steady decline took place with the periods of peak production showing no upturn in the prices asked. The decline in board prices naturally would indicate a like decline in the finished boxes; but when due allowance is made for the lessened cost of this raw material it is found that the box salesmen in their anxiety for volume of business dropped the level of their prices far below any figure justified by the board maker.

It has been the practice for many years to judge a salesman by the total amount of his sales expressed either in dollars or in volume, and in many plants a bonus or commission is paid on this basis. It is natural under these circumstances for the salesman to strive for each order regardless of price and soon he assumes the attitude of the purchaser and places himself in opposition to the production department. This false position of a salesman has been corrected in some plants by a simple method of encouraging profits. For each salesman the profit made on his sales is figured and a per cent or bonus is added to his remuneration based on his total profit. If such a plan could be wisely adopted a marked improvement would be found in competitive conditions.

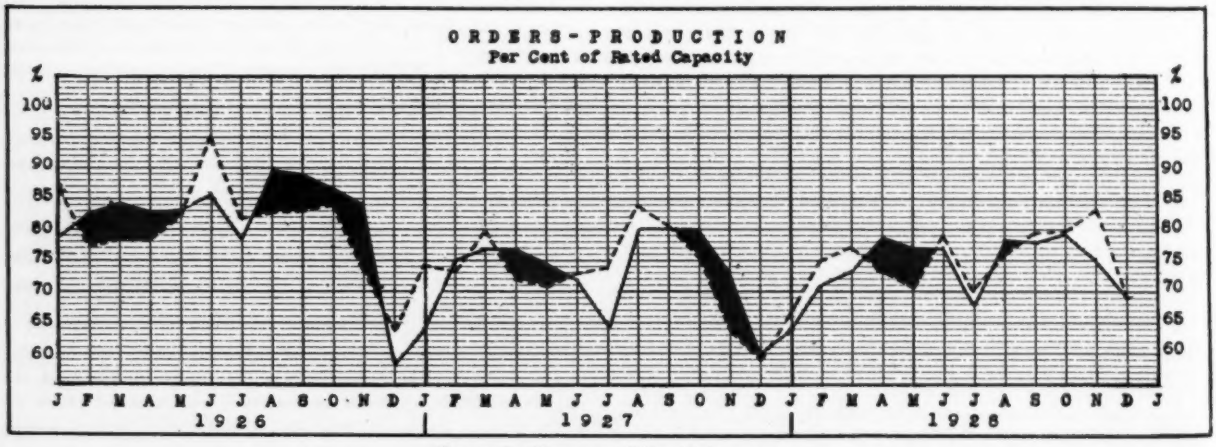


CHART 3. BOXBOARD MILL OPERATIONS

Rated capacity is the average production per hour multiplied by 144 hours to give the total rating for a week. The orders booked are divided by the rated capacity and expressed in a percentage. In like manner the production is figured as a percentage and both are here consolidated by months. The black areas indicate production in excess of orders and the white areas the reverse. It will be seen from the extent of the areas that a better control was exercised in 1928 than previously.

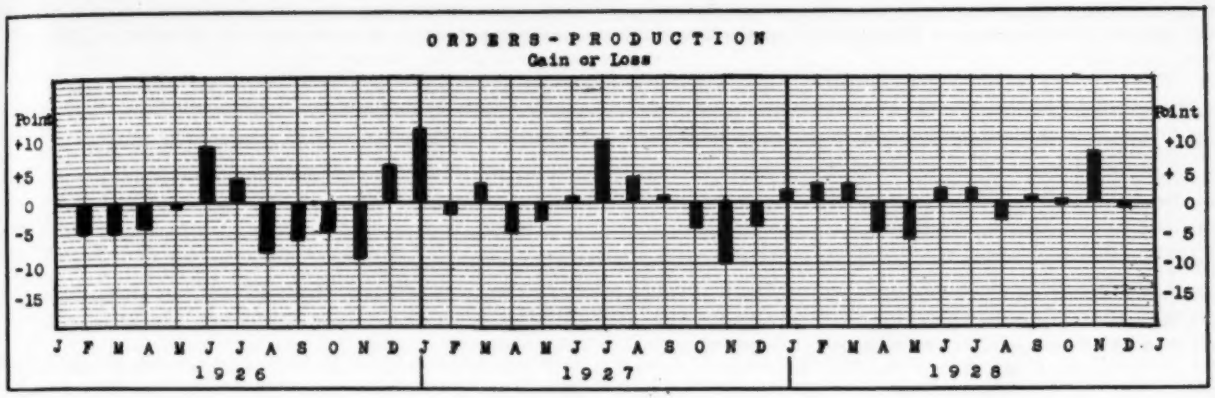


CHART 4. BOXBOARD MILL OPERATIONS

The spread between orders received and tonnage made as recorded on Chart No. 3, is not readily seen in that type of graph. To make this feature clearer, the bar form of chart is used with the differences termed "points." When orders are in excess of production the bars extend above the horizontal line and below when the condition is reversed.

Solid Fibre

The situation in the Solid Fiber division of the industry during 1928 was much the same as that described for corrugated. Plants and equipment were improved and the speed of the pasting machines, although not showing as great an advance as for the corrugators, stepped up about 5 per cent as an average in its square footage production.

The plant activity as reflected in the hours of operation was greater in the past year, with an average of 81.1 per cent, contrasted with 78 per cent and 77 per cent for 1927 and 1926, respectively. Chart 5 displays the percentage of normal running time and it will be seen that the seasonal fluctuation in solid fiber demand had less effect upon operation than expected. This was due largely to the development of new uses which added a volume of business at a time when ordinarily the demand drops off.

The hand-to-mouth buying mentioned above has had its effect on solid fiber orders with "days to run" dropping from 15.5 in 1926 to 11.7 in 1927 and 10.7 in 1928. While the loss in the averages of one day in 1928 over the previous year was not great, it was sufficient to effect the efficiency of plant operation. The continued decline in board prices demoralized the market for the sale of solid fiber boxes almost as completely as that for corrugated containers. If it had not been for the increased volume, and that coming at a time when business usually is dull, the solid fiber manufacturers would have been in the same serious conditions as found in the corrugated branch of the industry.

Folding Box Group

A "folding box" or carton is that commonly used for packaging such commodities as foodstuffs, cosmetics, medical supplies, etc. It is made of stout box board but capable of being bent over or collapsed, unlike the set-up or rigid box used for candy, shoes, etc. The cartons are usually printed in attractive colors with trademarks or brands to identify the contents, and in consequence the manufacturers must be equipped with color presses and facilities for reproducing the many artistic designs called for.

OPERATION

In the Folding Box Group, the box board used represents a smaller percentage of the total cost than in the Container Group, and a higher degree of skilled labor is required. Greater plant efficiency and cooperation is found where more intelligent operators are employed, but in times of low demand these must be kept on the payroll to avoid disruption of the plant's effectiveness.

In 1927 the average plant activity as reflected by the running time was 72 per cent of the full rated hours. In 1928 the percentage stood at 76 per cent, and while the gain of 4 per cent was not large, it aided in the bettering of operating conditions with less non-chargeable idle time. The seasonal fluctuations while present were not as pronounced during the year as formerly.

SALES POLICY

The folding box is replacing the set up box in a number of places due to convenience in handling, the small amount of floor space needed for storage, and the reduced spoilage from breaking. The installation of automatic filling machines by an increasing number of large users has also built up the demand. With a greater volume it would seem logical that prices should advance, but here again the unhealthy condition of the box board market has had its effect. Compared with 1927, a year when but few folding box plants showed an adequate profit, 1928 might be considered as being in parallel; and although it did not witness the ruinous competition of the Container Group, the price levels were far from satisfactory.

Conditions vary even in similar plants in the same locality. Because of some special order or the service to a few customers whose needs are growing, one plant may be prosperous, while his nearest competitor may have difficulty in keeping his plant running from day to day.

The larger plants that enter into competition for the so-called big contracts, found in 1928 a lower level of prices than ever before and more houses bidding for the work. Capacity to produce figured on an eight hour day is far in excess of the demand, but to reduce costs and meet low prices some plants are operating two and even three shifts and instructing their salesmen to procure the necessary volume with scant regard for price levels.

Association Activities

The Paperboard Industries Association is organized to promote the welfare of the industry and through its activities during 1928 has made distinct progress.

SALES PROMOTION

The competition between the product of one industry with that of another has brought about a demand for a new type of sales effort conducted by men trained as engineers who seek to develop new fields where an industry's output may be economically used. It often occurs that prospective users are so widely spread throughout the country that the salesman of any one company cannot devote sufficient time to study their needs with the hope of obtaining a sufficient volume of business to compensate for the effort. Furthermore his interest is always a selfish one—that of procuring orders for his company. On the other hand, the sales promotion engineer employed by an association approaches the problem from the standpoint of benefiting the prospective users; knowing that if he is successful, the volume of new business created throughout the country placed in the hands of the association members will, in the aggregate, be ample reward for the time spent.

During 1928 many sales promotion projects for the wider use of corrugated and solid fiber containers and of folding boxes were

brought to a successful close. This added to the demands on the box makers and in consequence to the tonnage required from the box board mills.

Traffic Department

The acceptance by the railroads of commodities packed in corrugated or solid fiber containers is governed by traffic packing specifications and regulations issued under the sanction of the Interstate Commerce Commission. These regulations are subject to alteration and addition as conditions arise. It is the duty of the Association's Traffic Department to be constantly alert to safeguard the industry against changes detrimental to its progress and to encourage the acceptance of new commodities where proof is established that they can be safely carried in fiber containers. During the year just passed many such items have been added or the scope of the present rule widened to permit greater use of the industries' products. Among these are shipments of cotton piece goods; paints, varnishes, shellac; house trim, wooden partitions, panels; tin plate; paper, binders board, bristol, cardboard, pulpboard, etc.

A number of uncompleted projects are docketed for acceptance in 1929, which will add substantially to the opportunity for the sale of box board and its fabricated products.

Statistical and Accounting

Statistical reporting of stocks on hand, orders and production, has been carried on during 1928 in the mill, container and folding box divisions and the results forwarded to its members and to the Department of Commerce for regular publication. Trade magazines were supplied with similar data so that their readers might know of the progress made from month to month.

The installation of the uniform plan of cost accounting was started or completed in 14 members' plants during the past year. This is a service, rendered without charge to members, that has proven to be of value particularly to the smaller plants.

A survey of the rates of depreciation taken on the physical assets in both members' and non-members' plants was made early in the year. This was conducted in cooperation with the Bureau of Internal Revenue at Washington and resulted in an agreement upon a schedule of uniform rates for Folding Box manufacturers. At the present writing the schedules for the Container and Box Board mill groups have not been completed.

Federal Trade Conference

On November 3, 1928, there was held a trade practice conference under the auspices of the Federal Trade Commission. The association sponsored the meeting to which all those engaged in the industry were invited. A set of resolutions was prepared stating certain existing practices found to be at variance with good business ethics and plans were made not only for ridding the industry of them but also for establishing a representative committee to function in continuation of the effort to place the industry on a better business basis.

1928-1929

In retrospect the year just past is a disappointment. With many industries forging ahead in this period of prosperity, it seems unnatural that the paper board industry with its large investment in plants and equipment and its millions of dollars of annual sales should not have participated. In looking forward into 1929, the future seems to us a little brighter. When the pendulum has swung one way it must reverse itself and at this time it would appear that the worst has passed. The prosperity of customers of our industry is well assured for the first half of this year and indicates a continued and increasing demand for boxes in which they will ship their products.

The paper board industry is suffering, more severely than many others, from over capacity to produce. This has been brought about by the false optimism of some of those engaged in it and the anticipated growth in demand has been discounted for several years to come. Time will effect a cure provided the increasing demand is not offset by still greater plant expansion.

For the individual plant, less striving for volume and more insistence in obtaining a fair price will result in greater net profit. For the industry, a production policy based upon current demand and a better spirit of cooperation are essential to bring about a period of prosperity.

NEW BELOIT MACHINES IN 1928

The Beloit Iron Works, of Beloit, Wis., installed the following new paper making machines during 1928:

Dunn Sulphite Paper Company—132-inch Yankee. This machine to make all sulphite tissues.

International Paper Company, Camden Mill—Two 210-inch Fourdrinier kraft machines.

Hawley Pulp and Paper Company—236-inch Fourdrinier news machines.

Thunder Bay Paper Company—245-inch Fourdrinier news machines.

Longview Fibre Company—172-inch Yankee. This is the widest Yankee machine in the world and is equipped with a 12-foot drier and is making large productions of kraft specialties.

Port Huron Sulphite Paper Company—132-inch Fourdrinier machine. This machine is for all sulphite papers.

Kalamazoo Vegetable Parchment Company—166-inch Fourdrinier machine. This machine is for sulphite papers.

Rhinelander Paper Company—140-inch glassine machine.

Ohio Box Board Company—128-inch cylinder machine.

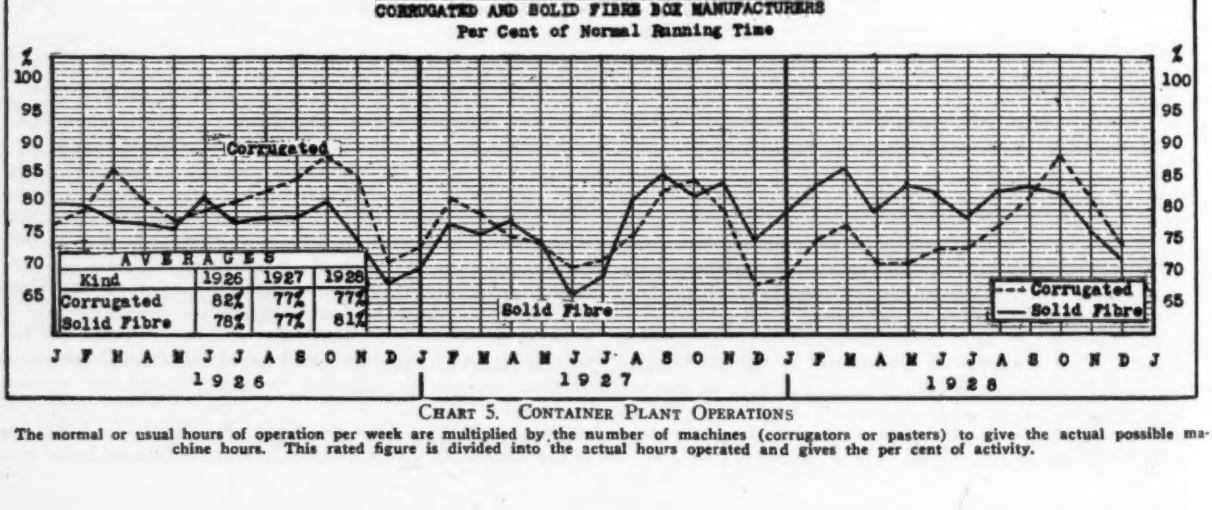


CHART 5. CONTAINER PLANT OPERATIONS

The normal or usual hours of operation per week are multiplied by the number of machines (corrugators or pasters) to give the actual possible machine hours. This rated figure is divided into the actual hours operated and gives the per cent of activity.

Wood Pulp Industry Enjoys Steady Year

Outstanding Features of Past Year Were Satisfactory Volume of Business Transacted and Stabilization of Quotations—Rapid Expansion of Paper and Pulp Industry in Southern States and Pacific Coast Exerted Great Influence on Market—Development of News Print Industry Resulting in Over-Production Was Another Important Factor—General Outlook for Current Year Very Promising From Statistical Standpoint.

Written Especially for the Annual Number of the Paper Trade Journal by O. F. Swanson, Sales Manager of J. Andersen & Co., and the Pulp and Paper Trading Co.

THE pulp industry throughout the world is so closely related to its big allies, the paper and board industries, that the slightest depression or improvement in any one of these industries rapidly reflects conditions of the others, and this is most evident in the pulp industry, of which the outstanding features of the past year are the stabilization of prices and the comparatively steady and satisfactory business throughout the year in chemical pulp.

The paper and board industries, particularly of the United States are evidently passing through a period of marked evolution and 1928 is likely to be recorded in the history of these industries as a year of great development, re-building of mills, technical improvements, and displacement of considerable tonnage of paper and board, formerly supplied by the so-called converting mills with similar products from mills manufacturing not only the finished product, but also their own pulp.

This was particularly true in the board and wrapping divisions, and while the demand for all kinds of paper and board is steadily increasing, the converting mills found it somewhat difficult to secure pulp at sufficiently low prices to enable them to compete with paper and board mills situated in the South and on the Pacific Coast making their own pulp, which usually resulted in a decrease in the tonnage of the regular product made at certain converting mills and a corresponding decrease in the grades of pulp required by these mills for the paper and board, of which the production was decreased for the above, and possibly other reasons.

Situation of Converting Mills

While extremely interesting to the trade in general and especially so for the manufacturers and buyers of paper, the situation of the converting mills is far from hopeless because after all their ability to compete with mills manufacturing their own raw materials, depends in a great measure on the cost and quality of pulp procurable in the open market and with this very important raw material, of which the domestic production is far from equivalent to the enormous requirements of the converting mills, is admitted free of duty, and rightly so, in the United States it is only a matter of price on the grades required and the quality of same, and as the quality has stood the test for many years' past, the price will undoubtedly be adjusted so as to enable the paper manufacturers to carry on. With a few exceptions the prices on domestic pulp f.o.b. the combination pulp and paper mills are decidedly lower than prices on imported pulp f.o.b. cars at the consumers' mills.

In order to encourage the American paper industry at large, and to facilitate the manufacture of paper and board of qualities equal or better if possible to those produced in other countries, it is absolutely necessary that the paper mills here have access to the best grades of pulp at about the same prices other countries are paying. Should this ever become impossible a decrease in the domestic production of various grades of paper and board together with an increased consumption of imported paper would be the inevitable result. Another important point, which must not be ignored, is that the present large pulp producing countries are so well supplied with wood extremely suitable for the manufacture of all kinds of pulp, that it is of vital interest to them to convert same into wood pulp. The condition in this respect in the United States is evidently the opposite regarding spruce wood from which the better grades of pulp are producted and of which wood our forests are reported steadily decreasing. Fortunately Canada, Sweden, Norway and Finland are in a position to supply the United States with a large tonnage of both chemical and mechanical wood pulp of excellent quality, and at reasonable prices, thereby saving the American spruce wood for other necessities, and are pleased to continue to do so as long as conditions permit.

Expansion of Southern Kraft Industry

The rapid progress and great expansion of Southern mills manufacturing kraft paper and board, together with the increased production on the Pacific Coast of both paper and pulp, exerted the greatest influence on the pulp business of all the various elements by which this industry is affected, and were it not for the fact that the pulp is manufactured there at low costs, compared with costs of similar grades of pulp made elsewhere, the Northern converting mills would have used more chemical pulp last year than ever before. The enormous expansion of the Canadian news print industry, resulting in over-production, has also had its effect on the pulp business, but perhaps not altogether detrimental.

Effect of News Print Situation

Some paper mills in the United States, formerly manufacturing news print, were forced to discontinue this grade, and to re-equip their mills with additional or different machinery for the manufacture of various grades of paper presumably more appropriate for the locality of such mills, and happily quite often, more remunerative; others were less fortunate and closed down. As a rule, such changes in the products required a greater variety of imported chemical pulp and less domestic mechanical pulp, which were either made at the mills from American and Canadian pulpwood, or to a large extent, supplied by Canada and Scandinavia. The decided decrease in the domestic production of mechanical wood pulp, as well as in the imported tonnage, reflects clearly the conditions largely brought about through competition with imported news print, and of all the various grades of wood pulp mechanical pulp occupied the weakest position.

The Canadian ground wood production of 1928 showed an approximate decrease of 30 per cent as compared with available figures for 1926, and this situation was not brought about by unfavorable water conditions, which has frequently been the case in the past, but mainly by the decreased consumption of this commodity not only by converting mills in the United States, but in other countries as well. That there is a substantial over-production in ground wood of Canada and Scandinavia combined, is a conceded fact and the unfavorable conditions throughout the past year in this grade both as to demand and prices can also be attributed to this situation.

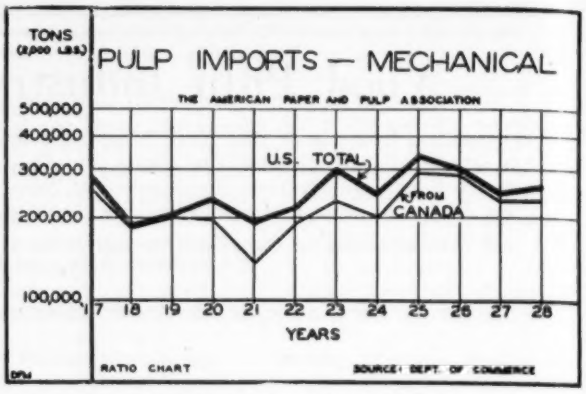
Factors Affecting Ground Wood Market

In view of the severe Canadian competition in news print, not only in the United States but in Canada and elsewhere, too much reliance must not be placed on other factors with tendencies to improve or depress the ground wood markets either here, in Canada or Scandinavia, such as possible temporary scarcity of pulpwood in the United States, occasional dry periods in any pulp producing locality, or spasmodic, brisk or sluggish demands for certain finished products in which ground wood constitutes the main ingredients, because such influence can only have a temporary effect on the market. In order to establish a permanent cure, important changes and developments for creating a steady and increased demand is necessary before a legitimate profit can be expected on the capital invested in ground wood mills, and on account of the importance of this pulp in the paper and board industries, it is reasonable to assume that diligent search for remedies for curing the unfavorable situation will not only continue, but eventually be found.

Similarly, the decreased domestic production of unbleached sulphite can be attributed to practically the same cause, while the imported tonnage of unbleached sulphite, and by the way, chiefly on account of its high quality, following a reported decrease of 9.1 per cent during 1927, recuperated with an increased import of 8.8 per cent during 1928. Consumption of bleached sulphite increased steadily by 5 per cent annually over the same periods, and the major part of this increase appears to be taken care of by domestic sources, and no country is superior to the United States in quality of this pulp.

Bleached Sulphite Held Strongest Position

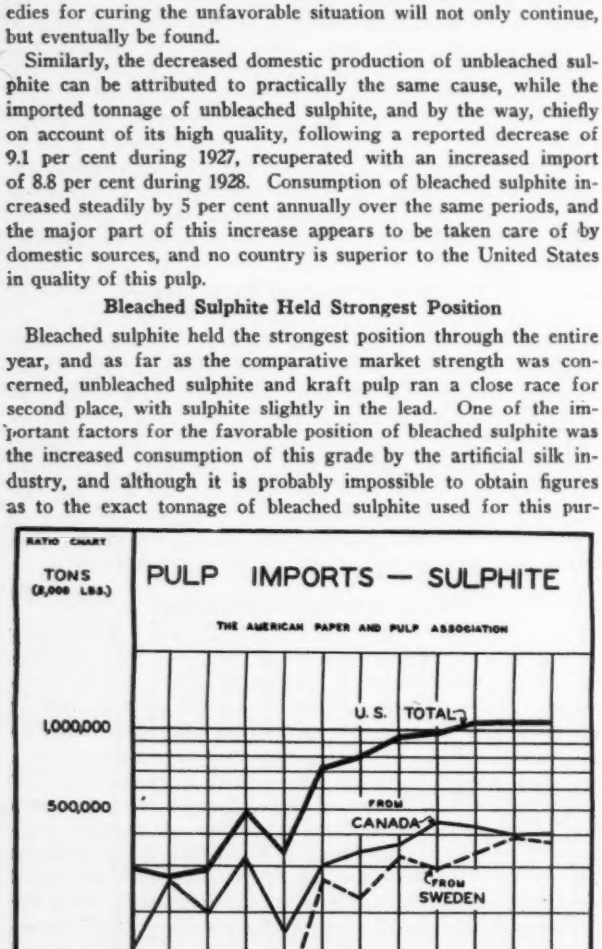
Bleached sulphite held the strongest position through the entire year, and as far as the comparative market strength was concerned, unbleached sulphite and kraft pulp ran a close race for second place, with sulphite slightly in the lead. One of the important factors for the favorable position of bleached sulphite was the increased consumption of this grade by the artificial silk industry, and although it is probably impossible to obtain figures as to the exact tonnage of bleached sulphite used for this purpose in 1928, it is estimated that this industry consumed at least 150,000 tons.

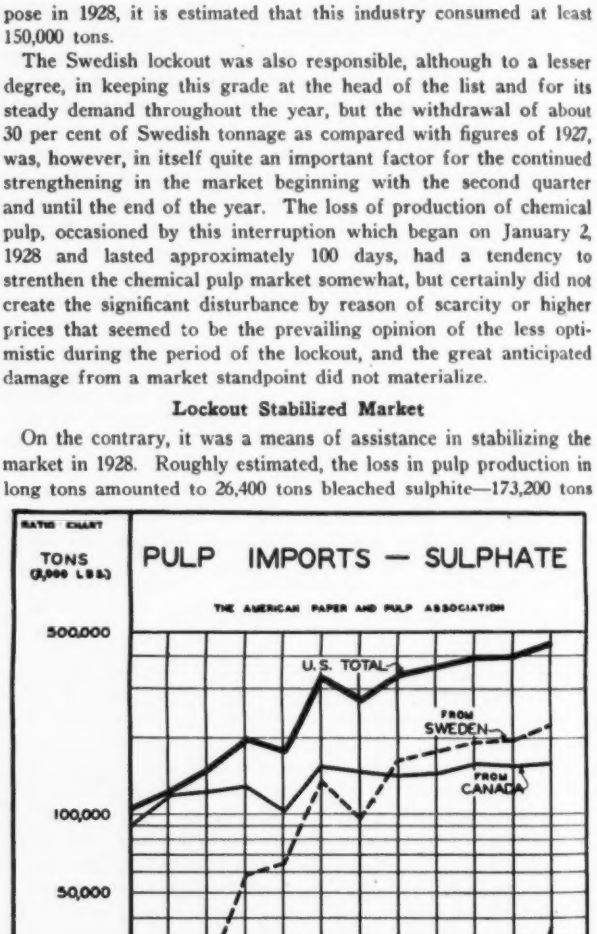


The Swedish lockout was also responsible, although to a lesser degree, in keeping this grade at the head of the list and for its steady demand throughout the year, but the withdrawal of about 30 per cent of Swedish tonnage as compared with figures of 1927, was, however, in itself quite an important factor for the continued strengthening in the market beginning with the second quarter and until the end of the year. The loss of production of chemical pulp, occasioned by this interruption which began on January 2, 1928 and lasted approximately 100 days, had a tendency to strenthen the chemical pulp market somewhat, but certainly did not create the significant disturbance by reason of scarcity or higher prices that seemed to be the prevailing opinion of the less optimistic during the period of the lockout, and the great anticipated damage from a market standpoint did not materialize.

Lockout Stabilized Market

On the contrary, it was a means of assistance in stabilizing the market in 1928. Roughly estimated, the loss in pulp production in long tons amounted to 26,400 tons bleached sulphite—173,200 tons





unbleached sulphite—103,700 tons unbleached sulphate or kraft pulp, making a total loss of 303,300 tons. Based on the normal yearly production of Swedish chemical pulp, this is equal to a loss of about 22.4 per cent, but in spite of this great loss in tonnage the Swedes were able to take care of their obligations in a creditable manner, buth with reference to tonnage and prices.

Sulphate Pulp

Sulphate pulp—kraft pulp—developed a substantial increase in consumption by approximately 10 per cent as an average for both periods. The production and consumption of soda pulp varies but slightly, but 1928 might show a gain of approximately 7 per cent over 1927. In the aggregate, chemical pulp indicates an average increase of about 4.5 per cent, and imports slightly below 1 per cent each year. Consumption of all chemical pulp shows an increase of 3.2 per cent per annum, and the total production and import of all kinds of wood pulp collectively practically equals the figures of 1926. The drop of about 3 per cent experienced in 1927 was regained in 1928, thus indicating that the tonnage imported in 1926 exceeded the actual requirements, and also that the equilibrium became re-established 1928.

Norway and Finland

Norway and Finland at the close of 1928 were in the strongest position of all pulp manufacturing countries, with almost 80 per cent of their production for 1929 reported disposed of, and for this reason and also on account of anticipated important business from England and other European countries, should not be particularly keen for large commitments at the present.

Pulp Business More Stabilized

As previously referred to, the pulp business for 1928 was satisfactory and besides more stabilized than for several years past, and while not particularly brisk during the first quarter of the year, in spite of the labor trouble in Sweden, each quarter thereafter showed a gain over the preceding quarter, and October and November of last year were record months, both regarding sales for prompt and forward deliveries.

Production and Consumption 1926-1928

The figures below describe what has actually taken place relative to production, import and consumption of various kinds of pulp in the United States over 1926, 1927 and 1928.

	Ground Wood	Sulphite: Bleached	Sulphite: Unbleached	Sulphate Bleached and Unbleached	Soda	Total Chemical	Grand Total
1926							
U. S. production	1,774,192	657,953	941,823	523,878	496,920	2,620,574	4,394,766
Import	303,759	295,336	656,990	479,673	.....	1,431,999	1,735,758
Consumption	2,077,951	953,289	1,598,813	1,003,551	496,920	4,052,573	6,130,524
1927							
U. S. production	1,630,612	678,573	893,947	622,784	487,478	2,679,782	4,313,394
Import	245,599	321,726	597,042	474,810	.....	1,393,578	1,639,177
Consumption	1,876,211	1,000,299	1,490,989	1,097,594	487,478	4,073,360	5,952,571
1928							
U. S. production	1,470,000	732,869	872,331	730,800	521,000	2,857,000	4,427,000
Import	247,000	319,350	649,300	485,600	.....	1,454,250	1,701,250
Consumption	1,817,000	1,052,219	1,521,631	1,216,400	521,000	4,311,250	6,128,250
Increases or Decreases							
Production 1926-27	— 8.1%	+ 3.1%	— 5.1%	+18.9%	— 2.0%	+ 2.3%	— 1.9%
Production 1927-28	— 3.7%	+ 8.0%	— 2.4%	+17.4%	+ 6.1%	+ 6.6%	+ 2.6%
Import 1926-1927	— 9.2%	+ 9.0%	— 9.1%	— 1.0%	.....	— 2.7%	— 5.6%
Import 1927-1928	+ 0.6%	— 0.7%	+ 8.8%	+ 2.3%	.....	+ 4.4%	+ 3.8%
Consumption 1926-1927	— 9.7%	+ 5.0%	— 6.8%	+ 9.4%	— 0.2%	+ 0.5%	— 2.9%
Consumption 1927-1928	— 3.2%	+ 5.2%	+ 2.0%	+10.8%	+ 6.9%	+ 5.8%	+ 2.9%

From a statistical point of view, the outlook for 1929 is very promising for chemical pulp and contracts already concluded for deliveries over the year cover a much larger tonnage than contracted for at the same period last year for deliveries over 1928, and as it is estimated that approximately 65 per cent of the world's production of the current year has now been sold, the available tonnage of the most favored brands for this market must be considerably less than indicated by the above figures.

The following table shows a comparison of prices of mechanical and chemical pulp at the beginning and the end of the year:

Mechanical Pulp

(Ex-Dock)	Quotations for Jan. 5, 1928	Quotations for Dec. 26, 1928
No. 1 Imported—		
Moist	28.00 @ 30.00	28.00 @ 31.25
Dry	32.00 @ 34.00	32.00 @ 34.00
(F. o. b. Mill)		
No. 1 Domestic	26.00 @ 30.00	26.00 @ 29.00
Screenings	15.00 @ 20.00	15.00 @ 20.00

Chemical Pulp

(Ex-Dock Atlantic Ports)		
Sulphite (Imported)—		
Bleached	3.40 @ 4.25	3.65 @ 4.40
Easy Bleaching	2.65 @ 2.80	2.75 @ 2.90
No. 1 strong unbleached	2.40 @ 2.65	2.50 @ 2.80
Mitscherlich unbleached	2.55 @ 3.25	2.55 @ 3.25
No. 2 strong unbleached	2.30 @ 2.40	2.40 @ 2.50
No. 1 Kraft	2.55 @ 2.75	2.50 @ 2.75
No. 2 Kraft	2.40 @ 2.50	2.40 @ 2.50
Sulphate—		
Bleached	3.65 @ 3.85	3.75 @ 3.85
(F. o. b. Pulp Mill)		
Sulphite (Domestic)—		
Bleached	3.20 @ 4.75	3.40 @ 4.75
Easy Bleaching Sulphite	2.60 @ 2.75	2.60 @ 2.75
News Sulphite	2.40 @ 2.65	2.40 @ 2.50
Mitscherlich	3.25 @ 3.70	3.00 @ 3.25
Kraft (Domestic)	2.60 @ 3.30	2.50 @ 3.30
Soda Bleached	3.25 @ 3.50	3.15 @ 3.30
Sulphate Screenings—		
Coarse	.75 @ .85	.75 @ .95
Refined	1.50 @ 1.85	1.50 @ 1.65

EXTENSIVE POWER PROJECTS

Extensive power projects will be launched early this spring following construction of the Conklingville Reservoir and it was announced this week that the New York Power and Light Corporation will open bids next month for construction of a mammoth power house a short distance below the new dam. The Conklingville Reservoir and the hydro-electric developments planned by paper manufacturing interests along the Upper Hudson River during the next few years will represent an investment of approximately $60,000,000. Construction of the new power plant at the Conklingville Dam is not the largest of the projects under consideration. At the junction of the Hudson and Sacandaga Rivers near Hadley the New York Power and Light Corporation will build a dam and power plant costing between $4,500,000 and $5,000,000 while a large sum will also be expended on a dam and power house at Palmer Falls.

In addition to these developments the company is planning to enlarge the Spiers Falls and Sherman Island plants. Another project which will be launched this spring is the building of a large dam and power plant by the Union Bag and Paper Corporation, at Hudson Falls, at a considerable expenditure. Another hydro-electric project is planned by the International Paper Company near its Fort Edward mills. As the result of requests from Chamber of Commerce organizations the Hudson River Regulating Board has decided to build a bridge across the reservoir instead of establishing a ferry as was originally proposed.

Chemical Market Experiences Very Good Year

Volume of Domestic Business Was Greater Than Ever Before, Due to Some Extent to Increased Use of Chemicals by the Pulp and Paper Mills—Expansion of Paper Industry Has Recently Called for Erection of Several New Chemical Plants Built Specially to Take Care of Paper Manufacturers Requirements—Prices for Paper Making Chemicals Ruled Steady During Past Year—The Outlook Is Encouraging.

Written Especially for the Annual Number of the Paper Trade Journal by Guy A. Gardner, Manager Chemical Division, M. Gottesman & Co., Inc.

IN reviewing chemical market conditions for 1928, we might say, as the old-time political spellbinder used to remark, "without fear of successful contradiction," that it was a very good year, taken by and large. From all accounts this seems to be the general opinion of the trade and in most directions a decidedly optimistic feeling prevails as to the outlook for 1929.

The items which are usually considered as making up the accepted index of the chemical market, such as sulphuric acid, caustic soda, soda ash, etc., were produced and sold in increased quantities during 1928. The production of sulphuric acid, for instance, was the greatest since the war, exceeding the previous record year of 1926 by about 7 per cent.

The volume of domestic business was greater than ever before, due in part to increased consumption of chemicals by the various industries and also to new processes and uses found for many of the staple chemicals. Export sales were also on a higher level than for many years past. In this connection it is hardly necessary to point out the greatly increased use of chemicals by paper and pulp manufacturers in the last few years. In fact, no little credit for the expansion of our chemical industry is due to the progressive spirit shown by the paper and pulp mills in using and perfecting new processes and to the expansion of paper manufacturing which has recently called for the erection of several new chemical plants, built especially to take care of the paper makers' chemical requirements.

The chemicals most widely used by the paper and pulp trade maintained fairly steady price levels during the year, there being few noteworthy price advances and only one or two reductions of consequence. This would seem to indicate that both the buyer and seller were fairly well satisfied with existing market conditions. Withdrawals against contracts were maintained at a steady pace during the entire year, and the usual summer let-down failed to materialize, particularly in the leading items. In the early fall, price schedules became somewhat firmer and market conditions improved, although contracts for 1929 delivery were very generally renewed at practically the same prices as in 1928.

One of the outstanding developments of the past year in the chemical industry was the increasing number of mergers and consolidations among the leading manufacturers. At this time it is hard to estimate just what effect these mergers will have on the market, although it may be assumed that on the whole they will have a stabilizing influence, lessening the tendency to over-production and to serious price cutting.

Another feature of great interest, particularly to large chemical consumers such as the paper and pulp manufacturers, is the contemplated readjustment of the tariff, preliminary hearings for which are now being held at Washington. Depending upon action taken by the Congress in this matter, we may expect to see many changes of far reaching importance to the chemical consumer as a result of such readjustments as may finally be decided on.

The past year also saw the erection and completion of one of the largest plants in the world for the production of nitrogen by air fixation, thus greatly increasing the domestic supply which will tend to replace, in large part, the use of Chilean nitrates in fertilizer and acid production. Another result of this process is that the production of niter cake in any sizeable quantity has been done away with and the industries that formerly used niter cake have been compelled to turn to other forms of sodium sulphate, such as salt cake, as it is now impossible for them to obtain the necessary tonnage of niter cake.

In general it may be said that the chemical industry is going into the New Year with prospects of continued good business at fairly remunerative prices. The rapid growth of rayon manufacturing and other large chemical consuming industries gives a very firm foundation for the belief that the chemical industry will enjoy continued prosperity during the coming year.

Salt Cake

Due to the increased production of kraft pulp, which resulted in an unusually heavy demand for salt cake, the manufacturers were kept busy during the entire year. Unsold tonnage was conspicuous by its absence and the market was firm with a tendency to rising prices.

Aluminum Sulphate

The demand for this important paper makers' chemical during 1928 was well maintained, in fact a broader distribution and larger production were in evidence during the entire year. The market was firm on both the commercial and iron free grades, no price changes of consequence being recorded. Withdrawals against contract were fairly heavy for paper making and also for water filtration. Price schedule for 1929 delivery on contract is the same as for the preceding year.

Chlorine

Due to the presence of two new manufacturers, competition for chlorine business was very keen and price reductions were in evidence during the year. Contracts for 1929 were made at a still further reduction on a basis of 3 cents per pound for tank car delivery on contract.

Bleaching Powder

The use of dry bleach by the paper mills has been replaced to a large extent by liquid chlorine in the past few years so that as a paper makers' chemical, dry bleach has lost much of its importance. The production, however, has been reduced in keeping with the lessened demand. Contracts over 1929 were booked at 2 cents per pound for car load lots in large drums. This was the same figure that prevailed in 1928 for contract shipment.

Sulphur

The production in 1928 was about the same as the preceding year. Competition from Pyrites was somewhat greater than in 1927 although the price generally held firm and contract withdrawals kept up well.

Caustic Soda

The output of caustic soda was considerably greater than in 1927 due in part to the larger tonnage used by the rayon manu-

facturers, oil refiners and other large industrial consumers. Shipments against contract went forward regularly during the year and it is reported that the production of most of the caustic soda manufacturers is well sold up for 1929. Contracts for delivery during the current year were entered on a base price of $2.90 per 100 pounds for solid caustic in carload lots at the works.

Soda Ash

The production of soda ash during 1928 was about 5 per cent greater than during the preceding year and the manufacturers had little difficulty in disposing of the entire production owing to the heavy demand from the various consuming industries. The price held firm during the entire period and contracts for 1928 were renewed on a basis of $1.32 per 100 pounds for the light ash in bags, car load lots at the works.

MORE ENGINEERING IN FORESTRY

As laid down by the fathers, forestry is founded on the origin, development, structure, functions, distribution and use of trees. In other words forestry is based principally on biology, not on engineering. But a machine dominated world is casting its great shadow over forestry, says the New York State College of Forestry, Syracuse University.

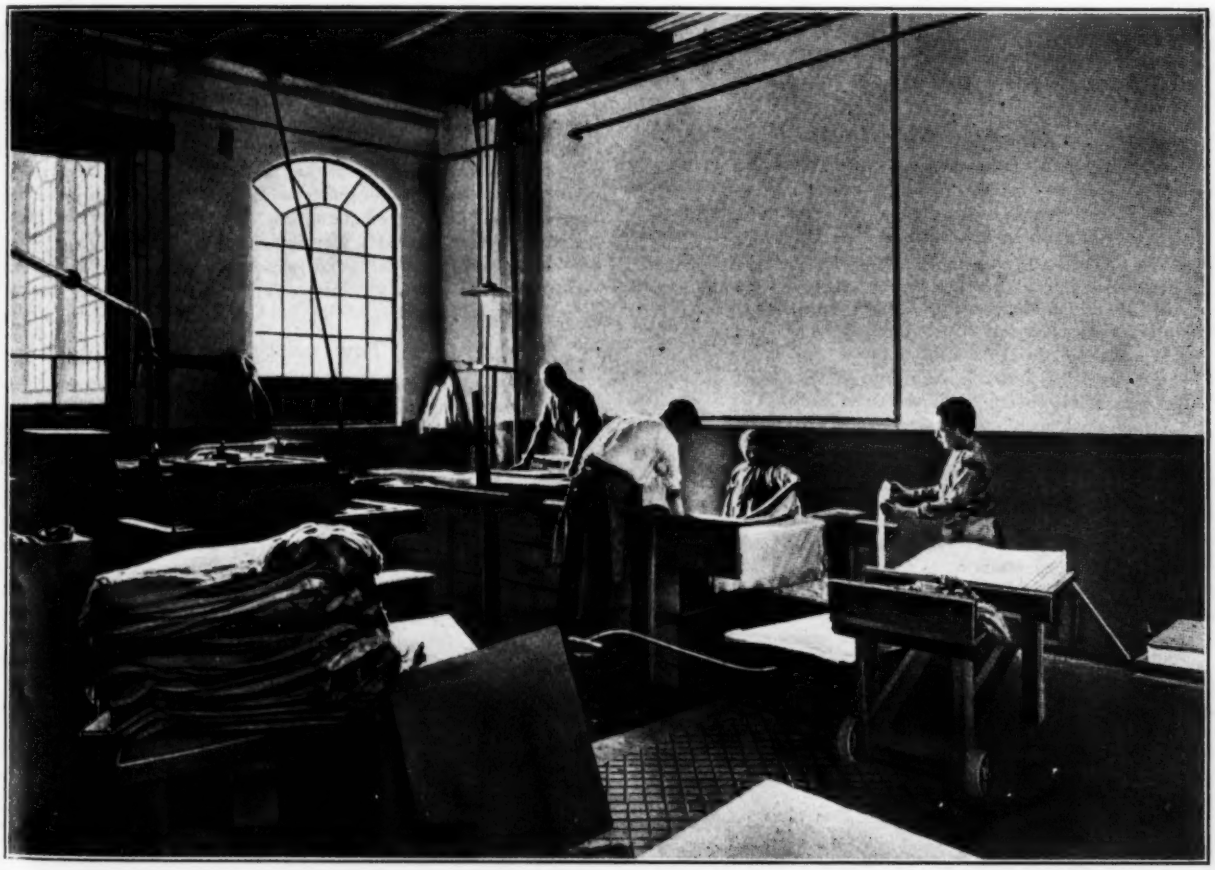
In pioneer days the machinery used in harvesting forest crops could almost be described as simple tools. Machinery was not needed and was not available had it been required. The ax, adz, draw-shave, and the small mill with one circular saw operated by a water wheel, oftimes no mill at all, comprised the mechanical implements used in cutting down trees and manufacturing them into useful products.

Today logging is carried on by complex assemblies of machinery both in the forest and at the place of manufacture. Forestry has reached into railroading and the mechanics of the gas engine. It has something to do with electrical appliances and has gone up into the sky where the aeroplane holds sway.

Knowledge about gas engines is now required of forest rangers. Today there is a gas engine school for forest rangers in New York State. The gas pump used in extinguishing forest fires is carried by men into the forest. If it breaks down, someone must be on hand to make quick repairs. The same may be said of the automobile used in carrying the materials, supplies and men into the woods. The so-called "high-lead" system of skidding and loading logs; the tractors, steam and gas engines that haul logs; the sawmill with its gang saws, planers and devices for carrying lumber from one machine to the other and the many pieces of equipment for the manufacture of wood into forms other than lumber together with the complicated mechanical plants of the paper industry indicate the extent to which mechanical knowledge is now necessary in forestry—a profession founded upon the quiet arboreal pursuit of tree culture.

TO DEVELOP BOTH MILL PROJECTS

The Pacific States Pulp and Paper Company, which recently announced plans for a mill at Priest Rapids, Idaho, has explained further that this will not interfere with their previously announced plan to build on a site in Washington, near Junction City, on Grays Harbor. This was to correct a rumor that the former plans for the Washington plant might be abandoned. The company states that both projects will be developed.



INTERIOR OF HAND MADE PAPER MILL, VAN GELDER ZONEN, AMSTERDAM, HOLLAND

Paper Stock Year One of Profitless Prosperity

Failure of Packers to Adjust Operations to Demand Kept Surplus on Market, Permitting of No Profit—Book Stock Was the Leading Grade in Waste Paper Division—Higher Prices Were Recorded on Mixed Papers, News, Book Stock, Containers, Prints and Shavings—New Rags Declined During First Three Quarter Periods But Reacted Favorably During Last Three Months of Year—Old Rags in Better Position.

Written Especially for the Annual Number of the Paper Trade Journal by Walter R. Hicks, of Daniel M. Hicks, Inc.

UNITED we stand, together we fight. Let this be our motto, "In the Republican Party is our Trust." That Grand Old Party, they see their duty and assess it, they believe in Protection, which is exercised chiefly by the liquor traffic. They insure prosperity under a progressive policy and the only premium is the Income Tax. They support the Eighteenth Amendment which may develop water power, but it leaves liquor in the hands of private ownership. Now election is past, and the Hoover Vacuum, true to it's calling, made a clean sweep. One of the greatest campaigns of all times! The campaign is over but we are living on the promises and setting our sales for the new year.

United we stand, together we fight, fight each other, overbidding, underselling, and the most active are crowned leaders of the industry, and if they are not crowned they should be. Waste that the packers once got for nothing, and that the mills paid for, the packers are now paying for and the mills want it for nothing, and the way some packers put up stock it is worth little more than nothing. Our slogan must be "Not a Kick in a Carload." We should pack to that end, deliver full value and demand full value received.

Economic Position Unchanged

Another year has rolled by and we find ourselves in the same economic position we were in a year ago. A review of the market is just a rehash of conditions. One scratches his head for ideas and gets nothing but sawdust. It is difficult to analyze a situation that is in direct contradiction to business practices. After mature consideration we arrive at the conclusion that it has been a year of profitless prosperity. The statistician and efficiency engineers have made a study of eliminating profits and have succeeded almost to the point of extinction.

The by-word of industry is "Merge or Submerge". The book mills, news mills, roofing mills and fiber mills have consolidated and these amalgamations have given the combinations greater purchasing power, and, in some cases, altered the method of buying, the effect of which has been felt in the market. United they stand, together we fall. These combinations, working through an association, have so organized their business that they operate intelligently, and operations are adjusted according to the market. These organizations function for the good of the mills and they benefit by co-ordination and co-operation.

The packers, who have no such organization, do not adjust their operations to the demand and when the mills are running fifty per cent of capacity the packers are running one hundred per cent, thereby keeping a surplus on the market which keeps prices at such low levels for extended periods, permitting of no profit. This condition has prevailed over the past year, with the result that few packers, if any, have made any money.

Waste Paper

There was a range of about six to eight dollars on waste paper throughout '28. Book stock was the leading grade, showing a sharp advance in the first quarter and, with the exception of a decline in July, holding firm for the balance of the year. Ledgers and writings were in a peculiar position all year. There should be a differential of four to five dollars a ton over books, but there seemed to be no demand at much better than a book price. If this condition continues it may result in the elimination of ledgers and writings, as it would not pay the packers to put them up separately. Some plants are putting them up with books and saving the extra labor. In percentage, between the low and the high of the year, mixed papers showed the greatest advance with one hundred per cent, news about seventy per cent, book stock about eighty per cent, containers and prints thirty per cent and shavings twenty-five per cent.

New and Old Rags

There was quite a drop in new rags over the first three quarter periods of the year, white shirts showing a twenty per cent decline, with all other grades acting in about the same proportion, depending upon their bleachability. The last quarter showed a marked improvement, all grades reacting, the demand continuing on into the new year.

It might be said that old rags seem to be in a better position than they have been for some time. Roofing rags were fairly steady and all grades of repacked stock commanded a fairly good price throughout the year.

The situation abroad, from the standpoint of home consumption, has shown steady improvement and rags have been in better demand abroad than they have at any time since the war. Belgium is said to have passed a law that all records pertaining to the Government be printed on rag paper because of the permanency of a rag sheet. This, in a measure, will affect the exportation of rags from that country.

Rope and Bagging

Bagging remained firm throughout the year, with the possible exception of gunny, which grade, though it showed a falling off in price, was always marketable. No. 1 bagging and roofing bagging maintained fairly even price levels over the year.

Rope was in a bad way. The big call was for all white rope for insulating papers, while the ordinary so called No. 1 grade was not readily marketed and consequently dropped to pre-war levels.

United we stand, together we fight! This sounds like the cry of the subway farers, but its application in another sense lends itself nicely to the situation in paper stock, a situation that illustrates the distinction between struggling and fighting. There must be a determined effort to improve conditions as they exist among the packers, to study demand and supply it intelligently, and united action along these lines should carry the fight to a successful conclusion.

HARRY H. CURTIS RESIGNS

Harry H. Curtis, sales manager for the Consolidated Water Power and Paper Company, of Wisconsin Rapids, Wis., for the past fourteen years, has severed his connection with the company. His resignation is effective February 15.

Census of Paper and Wood Pulp Manufacture

Products Valued at $919,891,465 by 709 Paper and Paper Board Establishments and Products Valued at $218,198,201 by 219 Wood Pulp Establishments Were Produced in 1927 According to Preliminary Statistics Just Issued by the Bureau of Census of the Department of Commerce at Washington—Total Production of Paper and Board in 1927 Was 10,002,070 Tons and Total Production of Pulp 4,313,403 Tons.

THE Department of Commerce announces that, according to data collected at the biennial census of manufactures taken in 1928, 709 establishments engaged primarily in the manufacture of paper and paper board in 1927 reported products valued at $919,891,465, and 219 establishments engaged primarily in the manufacture of wood pulp reported products valued at $218,198,201. These two lines of manufacture, which at preceding censuses were treated as a single industry, were treated as separate industries at the census for 1927. Because of this change in practice, the statistics for prior censuses are not strictly comparable with those for 1927.

The total production of paper and paper board in 1927 amounted to 10,002,070 tons (of 2,000 pounds), valued at $872,206,847. This total was made up as follows: Standard news print, in rolls and sheets, 1,519,737 tons, valued at $99,068,924; hanging paper, 109,850 tons, $8,748,152; poster, novel, news-tablet, lining, catalogue, etc., 183,338 tons, $15,573,062; book paper, 1,328,782 tons, $160,868,747; cover paper, 26,333 tons, $5,937,919; writing paper (fine), 508,808 tons, $105,148,140; wrapping paper, 1,525,305 tons, $162,579,549; paper boards (container boards, folding box boards, building boards, etc.), 3,773,608 tons, $211,263,855; tissue paper, 316,070 tons, $46,616,919; absorbent paper, 63,766 tons, $13,331,497; building paper, 625,589 tons, $40,062,024; other paper, 20,884 tons, $3,008,059.

The total output of wood pulp in 1927 was 4,313,403 tons, valued at $207,332,666, the principal items comprised in this total being as follows: Ground wood—steamed, 181,031 tons, valued at $6,857,710; not steamed, 1,429,378 tons, $39,101,493. Soda fiber, 487,478 tons, $32,842,265. Sulphite fiber—bleached, 680,288 tons, $53,847,246; unbleached, 881,709 tons, $45,337,305. Sulphate fiber, 593,955 tons, $28,133,175.

Of the 709 establishments reporting the manufacture of paper in 1927, 136 were situated in New York, 80 in Massachusetts, 55 in Pennsylvania, 53 in Ohio, 51 in Wisconsin, 42 in Michigan, 37 in New Jersey, 32 in Connecticut, 30 in Illinois, 26 in Indiana, 25

TABLE 1
SUMMARY FOR THE PAPER AND PULP INDUSTRIES: 1927

	Paper	Pulp
Number of establishments	709	219
Wage earners (average for the year)[1]	98,566	24,794
Wages[2]	$130,474,739	$31,527,358
Cost of materials, mill supplies, fuel, and purchased power, total[3]	$572,785,538	$151,325,425
Materials and supplies	$512,935,626	$134,231,864
Fuel and power	$59,849,912	$17,093,561
Products, total value[3]	$919,891,465	$218,198,201
Paper and paper board, produced for sale[3]	$807,969,857	
Pulp		$207,332,666
Other products	[4]$111,921,608	$10,865,535
Value added by manufacture[5]	$347,105,927	$66,872,776
Horsepower	[6]2,642,806	([7])

[1] Not including salaried employees.
[2] The amount of manufacturers' profits can not be calculated from the census figures, for the reason that no data are collected in regard to a number of items of expense, such as interest on investment, depreciation, taxes, insurance, and advertising.
[3] Includes $83,344,583, value of paper and paper board made for consumption in mills other than those in which produced.
[4] Converted paper products, $110,641,403; all other, $1,280,205.
[5] Value of products less cost of materials, mill supplies, fuel, and purchased power.
[6] Combined total for both industries.
[7] Not reported separately; included under "Paper."

TABLE 3
PAPER PRODUCTION—BY CLASS, KIND, QUANTITY, AND VALUE: 1927

Class	Quantity (tons 2,000 lbs.)	Value
Paper and paper board, aggregate	[1]10,002,070	[1]$872,206,847
Standard news print, in rolls and sheets	1,519,737	99,068,924
Hanging paper	109,850	8,748,152
Poster, novel, news-tablet, lining, catalogue, etc.	183,338	15,573,062
Book paper, total	1,328,782	160,868,747
Book paper	1,098,673	132,905,596
Offset	20,184	3,184,596
Body stock for coated paper	170,648	19,176,179
All other book paper	[2]39,277	[2]5,602,376
Cover paper	26,333	5,937,919
Writing paper (fine), total	508,808	105,148,140
One hundred per cent rag	15,576	10,462,226
Less than 100 per cent to 50 per cent rag	40,634	16,663,230
Less than 50 per cent rag	62,664	16,426,916
Sulphite bond	255,276	40,939,948
Other chemical wood-pulp writing paper	134,658	20,655,820
Wrapping paper, total	1,525,305	162,579,549
For bags, sulphite	56,964	5,597,853
For bags, sulphate	141,695	14,545,455
Unbleached sulphite wrapping	206,973	20,010,092
Bleached sulphite wrapping	26,787	3,446,275
Bogus and screenings	51,646	3,153,613
Greaseproof	23,073	2,621,381
Glassine	38,644	9,005,642
Heavy (mill wrappers, etc.)	35,352	2,027,737
Northern and Pacific Coast kraft	394,913	43,454,493
Southern kraft	242,382	21,792,638
Rope, jute, etc.	43,761	9,228,313
Ground wood and chemical manila	45,974	4,180,255
Tag board, light manila board, and pattern	41,280	5,298,836
All other wrapping paper	175,861	18,216,966
Board, total	3,773,608	211,263,855
Container boards:		
Liners	911,508	52,842,058
Chip (plain and test)	847,646	34,795,136
Straw (for corrugated container use)	340,996	16,868,917
Folding box boards (bending):		
Manila-lined (all lined boards)	405,673	24,037,734
Patent coated	185,347	12,805,444
Other folding box boards (including shell and unlined boards)	205,196	10,335,289
Set-up box boards (nonbending):		
Chip and straw	168,911	7,234,760
News board	179,041	8,045,854
Other (including tube, egg-case filler, pasted news, and pasted chip boards)	96,276	4,441,248
Building board:		
Wall board and insulating board	71,235	6,946,050
Binders' board	51,610	4,084,667
Cardboard	49,244	5,311,185
Leather board	24,195	2,498,496
Press board	6,938	1,452,683
All other board	229,792	19,564,334
Tissue paper, total	316,070	46,616,919
High grade	58,590	13,262,707
Manila and No. 2 white	40,929	5,817,197
Napkin	13,675	2,419,082
Toilet	119,777	14,268,263
Towel	40,310	4,140,829
Waxing	42,789	6,708,841
Absorbent paper, total	63,766	13,331,497
Blotting	13,090	2,700,322
Matrix	2,843	681,584
For vulcanized fiber	16,763	3,156,082
All other absorbent paper[3]	31,070	6,793,509
Building paper, total	625,589	40,062,024
Sheathing paper	61,326	2,607,607
Felt	503,774	32,790,921
Asbestos-filled[4]	60,489	4,663,496
All other paper	20,884	3,008,059

[1] Statistics include data for 792,388 tons of paper and paper board, valued at $64,236,990, produced and used in the same plants in the manufacture of converted paper products. (See Table 2.)
[2] Includes data for lithograph paper.
[3] Filter paper, paper for celluloid, paper for parchmentizing, etc.
[4] Includes paper reported as "asbestos paper" and "asbestos-filled paper."

in Maine, 24 in New Hampshire, 14 in Vermont, 12 in Washington, 11 in California, 10 in Maryland, and the remaining 71 in 19 other States.

Of the 219 establishments reporting the manufacture of wood pulp in 1927, 61 were situated in New York, 33 in Wisconsin, 26 in Maine, 13 in Washington, 12 in Michigan, 12 in Pennsylvania, and the remaining 62 in 18 other States.

The statistics for 1927 are summarized in the accompanying tables. These figures are preliminary and subject to such correction as may be found necessary after further examination of the returns.

TABLE 4
WOOD PULP PRODUCTION, BY PROCESS: 1927

	Quantity (tons 2,000 lbs.)	Value, f.o.b. mill
Wood pulp, aggregate	4,313,403	$207,332,666
For consumption [1]	[2] 3,740,849	[2] 168,554,754
For sale	[2] 560,571	[2] 38,271,761
Ground, steamed, total	181,031	6,857,710
For consumption [1]	175,478	6,683,587
For sale	5,553	174,123
Ground, not steamed, total	1,429,378	39,101,493
For consumption [1]	1,400,041	38,142,210
For sale	29,337	959,283
Soda fiber, total	487,478	32,842,265
For consumption [1]	368,987	24,912,839
For sale	118,491	7,929,426
Sulphite fiber, bleached, total	680,288	53,847,246
For consumption [1]	444,518	33,270,157
For sale	235,770	20,577,089
Sulphite fiber, unbleached, total	881,709	45,337,305
For consumption [1]	789,379	40,398,720
For sale	92,330	4,938,585
Sulphate fiber, total	593,955	28,133,175
For consumption [1]	525,526	24,652,777
For sale	68,429	3,480,398
Semi-chemical, total	11,983	506,151
For consumption [1]	([3])	([3])
For sale	([3])	([3])
Screenings, mechanical, total	8,229	95,907
For consumption [1]	7,965	89,980
For sale	264	5,927
Screenings, chemical, total	39,352	611,414
For consumption [1]	28,955	404,484
For sale	10,397	206,930

[1] Wood pulp made and consumed in the same plant.
[2] Not including data for semi-chemical pulp. (See footnote 3.)
[3] Cannot be shown without disclosing operations of individual establishments

TABLE 2
PAPER PRODUCTION—SUMMARY BY CLASS, QUANTITY, AND VALUE: 1927
(For detail see Table 3)

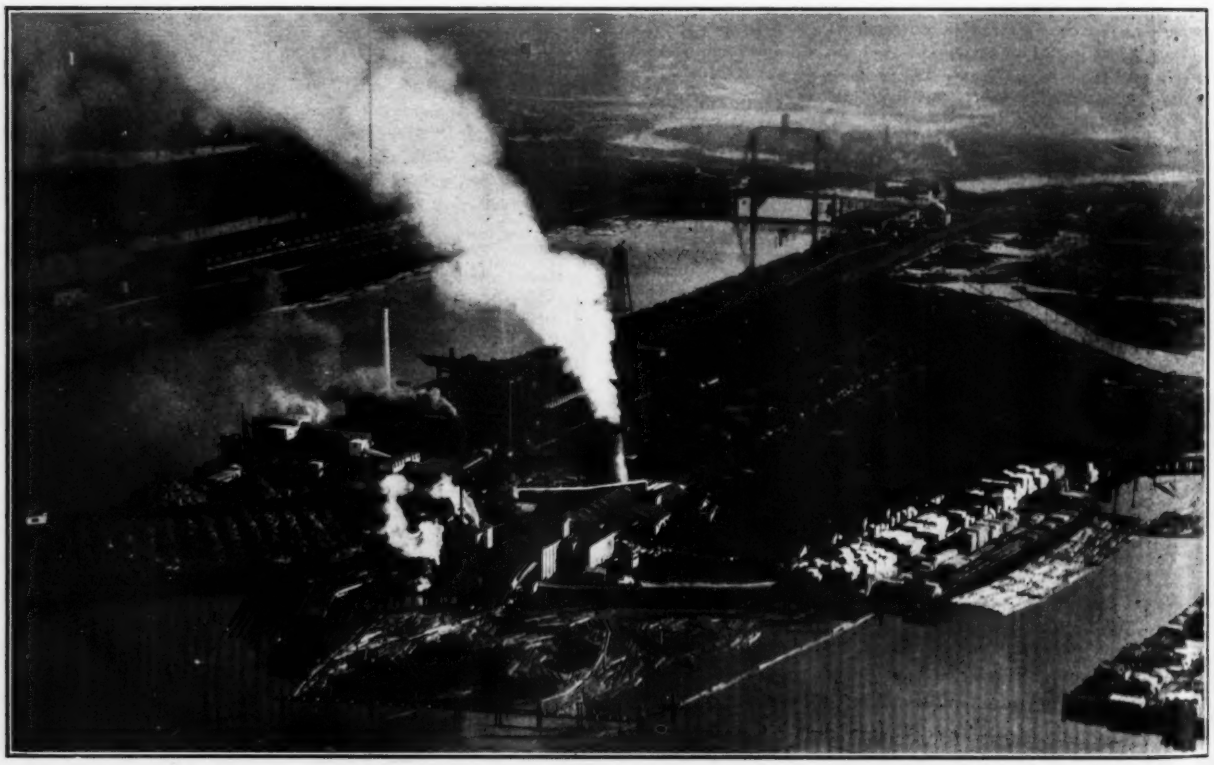
	Tons (2,000 pounds)	Value
Total	10,002,070	$872,206,847
Paper and paper board:		
Produced for sale	9,209,682	807,969,857
Produced for use in same plant	792,388	64,236,990
Standard news print, in rolls and sheets	1,519,737	99,068,924
Hanging paper	109,850	8,748,152
Poster, novel, news-tablet, lining, catalogue, etc.	183,338	15,573,062
Book paper	1,328,782	160,868,747
Cover paper	26,333	5,937,919
Writing paper (fine)	508,808	105,148,140
Wrapping paper	1,525,305	162,579,349
Paper board (container boards, folding box boards, set-up box boards, building boards, etc.)	3,773,608	211,263,855
Tissue paper	316,070	46,616,919
Absorbent paper	63,766	13,331,497
Building paper	625,589	40,062,024
All other paper	20,884	3,008,059

FINNISH PULP AND PAPER MARKET FIRM

Aside from the customary slackening in the markets at this season of the year, the demand for Finnish paper has been good with prices firm, Consul James R. Wilkinson, Helsingfors, says in a report made public by the Department of Commerce.

The chemical pulp mills have already placed about 75 per cent of their 1929 production. Exporters are not entirely satisfied with the price situation but improvements are looked for during the current year. The ground wood market has remained more or less at a standstill; some orders have been received for 1929 delivery but they have not been large in volume.

According to official statistics, exports of pulp and paper during the first 11 months of 1928 were as follows: Paper 22,578 metric tons (metric ton equals 2,205 pounds); sulphite pulp 326,823 tons; sulphate pulp 100,257 tons; mechanical groundwood 127,559 tons; and boards 40,530 tons. While all of these represent considerable increases over the corresponding period in 1927, the greatest gain was registered in shipments of chemical pulp.



NEW 120 TON SULPHATE PULP MILL OF THE UNION BAG & PAPER POWER CORP., TACOMA, WASH.

Over-Expansion of News Print Industry In Canada

Crisis Arose During Past Year Due to Rapid Development Which Resulted In An Installed Capacity For Production of 20 to 25 Per Cent In Excess of Market Requirements—Situation Resulted in Mad Scramble For Business at Practically Any Prices—Series of Conferences Resulted in Agreement for Reduction of Output to 80 Per Cent of Capacity and Pooling of Orders For Equitable Distribution.

Written Especially for the Annual Number of the Paper Trade Journal by C. L. Sibley

ALL other developments in the pulp and paper industry in Canada during the past year were overshadowed by the crisis which arose as the result of a serious over-expansion in the news print production end of the industry. With a year which broke all production records in practically every department of industrial and mercantile activity, including the news print industry itself, the fact remains that this industry stood practically alone at the end of the year in an unprosperous position, due to the fact that its rapid expansion had resulted in an installed capacity for production from 20 to 25 per cent in excess of any possible market requirements. Even in the early months of the year the evidences were apparent of what later resulted in a mad scramble for business at any price, and by the middle of the year the older and well-established companies, which had been endeavoring to control the situation by voluntary restriction of output, witnessed newer competitors gathering in orders at any old price and running their plants at 100 per cent capacity. Such a situation, of course, could not last; the lid was bound to blow off, and blow off it did. The evidence which was disclosed as to the extent to which price-cutting had been indulged in, even among those who were supposed to be working in more or less agreement, smashed such cooperative efforts as were being practiced, and the war was on.

Provincial Premiers Read Riot Act

To what lengths it would have been carried had not the Provincial Governments of Quebec and Ontario intervened can only be a matter of conjecture. But Premier Taschereau, of Quebec, and Premier Ferguson, of Ontario, acting as a unit, issued a peremptory call to the leading executives and read them the riot act in no measured terms. The executives were told that either they would control the industry in such a manner as to prevent the debacle which was threatened, or the Governments of the respective Provinces would control the industry for them. The net result was a series of conferences of the leading executives, beginning in August and continuing until the present month. These conferences resulted in an agreement for the restriction of output to 80 per cent of the capacity of the mills—or rather to the capacity of the market to absorb the output—and the pooling of orders for equitable distribution among the mills. The greatest difficulty, however, had yet to be tackled, and that was the difficulty in regard to a standard price for the current year. This difficulty is stated, at the time of writing, to have been overcome. But despite all, the industry faces at the beginning of the present year the most perplexing conditions which it has ever had to encounter, practically all mills being on curtailed production, with prices on such a basis that no hopes of the industry sharing as it should in the general prosperity can be entertained for the immediate future.

Six New Plants Come Into Operation

During the year 1927 six new establishments for the manufacture of news print came into operation in the Dominion, representing a daily output of 1620 tons, the result being that the average production of the Canadian mills in that year amounted to some 85 per cent of their maximum capacity, although the tonnage produced and shipped exceeded by 11 per cent the total of the preceding year. During the present year three important new mills have come into operation, namely that of the Lake St. John Power and Paper Company, with a capacity of 220 tons; that of the Spruce Falls Power and Paper Company, with capacity of 500 tons; and that of the Fort William Power and Paper Company, with a capacity of 150 tons. In addition, a number of new machines have been added to the equipment of existing mills, the net result being that while production and shipment of news print during the year exceeded that of 1927 by about 14 per cent, the installed capacity is so much greater that although the year started with capacity 15 per cent beyond requirements, it ended with capacity being from 20 to 25 per cent above the market demand.

Even at that the worst has not been told, for huge works for the establishment of other mills are now in course of construction, with some of them rapidly approaching the producing point. These include a 250-ton mill in New Brunswick, and another at the Bathhurst plant in New Brunswick of 65 tons; a 250-ton mill in Nova Scotia; and a new paper mill at Buckingham, Que., of 250 tons. In addition, several companies are adding new machines to existing plants. The outlook, therefore, is far from rosy.

Exports Increasing

Exports of news print in 1928 were on a larger scale than in any previous year, and there was a considerable increase in the shipments to overseas countries. While by far the greater part of the Canadian output of news print is still sent to the United States, which annually take about 90 per cent of the total exports, the year 1928 also saw increased shipments to Great Britain, Argentina, Australia and other markets overseas. For the first eleven months of the year the exports of news print amounted to 1,993,375 tons, of which 1,775,182 tons went to the United States and 238,243 tons to overseas countries. These figures compare very favorably with those for the corresponding months of 1927, when the total of 1,712,663 tons included 1,593,786 tons to the United States and 118,877 tons to other countries.

Production of paper other than news print was also greater than in the previous year, and as the domestic market is the principal outlet for these grades, the increased demand has reflected the excellent business conditions prevailing in Canada throughout the year. The manufacture of book, writing, wrapping and other grades of paper is, of course, on a much smaller scale than the manufacture of news print, but the mills making these grades have been able to operate well up to capacity. The mills engaged in manufacturing book paper have been handicapped to some extent by the change in the Canadian tariff permitting a drawback of 80 per cent of the duty on paper imported for use in magazines and periodicals, as a result of which change there have been increased importations of this grade of paper. In these lines the Canadian mills have developed and adapted their output to market requirements, so that practically every grade of paper in demand is now manufactured in this country, and "Made-in-Canada" paper can now be obtained in all but very few lines. In spite of this fact, there is still a considerable importation of paper of all

kinds, and in the last fiscal year the value of paper imported was close to $12,000,000. Competition in other markets is very severe, owing to the tariff walls and other causes, and exports of higher grade paper, mainly to Great Britain, Australia and New Zealand, were somewhat smaller than in the previous year.

Wood-pulp production during the year has kept pace with the increased output of paper, and in the case of sulphite pulp there was in addition a considerable increase in the exports. Canada now supplies a good proportion of the wood-pulp used in the manufacture of rayon or artificial silk, and large quantities of this pulp were shipped to the United States and the countries of Europe. As regards mechanical pulp, conditions have not been so favorable, for while the increased output of news print and other papers has called for a larger production of ground wood, the exports of this commodity declined appreciably from the previous year. The main causes for this decline were the falling off in demand from the United States and the competition from European producers.

The total exports of pulp and paper for the first 11 months of 1928 were valued at $174,756,988 as compared with $161,277,363 in the corresponding months of 1927. This was an increase of $13,-479,625, or 8 per cent. Exports of wood pulp alone in this period, however, were valued at $41,512,147 which was a decline of $1,-671,248 from the previous year's figures. News print exports in the period were valued at $127,694,880 as against $112,143,207 in 1927 to November.

Over-Production of Pulpwood

Some sawmill owners in the Maritime Provinces, who some time ago closed their plants because of unprofitable operations and turned their attention to pulpwood regretted their action. The pulpwood market in 1928 was in very poor shape. It was the old story of over-production. According to Ralph Bell, vice-president of the Canadian Pulpwood Association, a factor which prevented the scarcity of wood and the higher prices so confidently predicted a year ago was the removal of farmers' wood by motor truck in Maine and in many parts of Canada. A few years ago, he said, no one thought of moving pulpwood any great distance by truck, but today it was not an uncommon sight to see it moved twenty or twenty-five miles by such means and, as a consequence, hundreds of thousands of cords, heretofore inaccessible to driving streams, had suddenly become available by this new method of transportation. Mr. Bell stated that in 1920 it looked as if wood prices would never come down and as if there were going to be a permanent shortage. Today the picture was exactly the reverse. It appeared to some as if there would be a perpetual over-production and as if one could never get more than "wages" out of the pulpwood business. These areas of pulpwood would, he thought, be exhausted in from three to five years, and prices would then go up again. Having regard to this prospect, some of the owners of small mills have decided to quit the pulpwood business and re-open their lumber mills.

Consolidations the Order of the Day

One of the oustanding developments of the year was a large general movement towards consolidation in the news print industry, and further developments in this direction may be expected. The Laurentide Company and the St. Maurice Valley Corporation were merged under a new holding company named the Canada Power and Paper Company, with headquarters in Montreal. The amalgamation brought under unified control mills having a daily capacity of more than 1,400 tons, those of the St. Maurice Valley Corporation group being about 1,000 tons a day, and those of the Laurentide Company approximating 400 tons per day.

Another large merger was that of the Spanish River Power and Paper interests with the Abitibi Power and Paper Company, resulting in a giant corporation controlling the leading mills in Ontario.

There were consolidations also in book paper mills as a result of which the control of practically all the high-grade paper production in Canada has now passed into the hands of two groups—Smith-Crabtree and the Provincial Paper Mills. As they have for years enjoyed a heavy protective tariff of 25 to 35 per cent as well as a high import sales tax, they have been doing well.

Capital Investment

The great progress made by the pulp and paper industry is shown in the report recently issued by the Dominion Bureau of Statistics for 1927. This report shows that the total capital investment in the industry for that year was $579,853,552. In 1917 the total capital was $186,787,405, so that in ten years the amount was more than trebled. The figures would now stand much higher.

In 1927 the industry provided employment for 32,876 persons and the amount paid out in salaries and wages was $45,674,293, these figures being exclusive of the woods operators, who at certain seasons of the year number more than those employed in the mill. The total gross production for the year was $219,429,-753, and the importance of the industry in the economic life of Canada is further demonstrated by the statement that the gross contribution towards a favorable balance of trade resulting from the pulp and paper industry as a whole in 1927 amounted approximately to $179,459,362.

Water Power Developments

Water power development is so closely bound up with the pulp and paper industry that any review of that industry must necessarily include a review of the progress in hydro-electric installation. In this direction the Province of Quebec has led the way during the year.

New plants, and extensions to existing plants, actually placed in operation during 1928 added more than 300,000 h.p. to Quebec's hydro-electric installation; this additional capacity being mainly found in the new Paugan plant of the Gatineau Power Company (a subsidiary of the Canadian Hydro-Electric Power Corporation, the Canadian unit of the International Paper Company), and in additional units installed at the plants already in operation at Shawinigan, at Isle Maligne and at Quinze Dam.

The Paugan plant of the Gatineau Power Company was placed in operation with six units in September, 1928; each unit is of 34,000 h.p., giving a present installation of 204,000 h.p., while two additional units are provided for, which will bring the ultimate capacity of the station to 272,000 h.p. The same company is also installing a fourth unit in each of the other two plants lower down on the Gatineau River, the capacity of these additional units being 34,000 h.p. at Chelsea and 24,000 h.p. at Farmers. Both new units are to be in operation early in the present year.

The Gatineau Company has also in prospect an 80,000 h.p. development under a head of 68 feet at Nigger Rapids, some miles below Maniwaki on the Gatineau River.

The Gatineau Power Company is also addiing a second unit of 25,000 h.p. to the Bryson plant on the Ottawa River, the new unit to be in operation early this year.

In connection with the power supplied from the beforementioned plants, the Gatineau Company also has important transmission lines to construct, and during 1928 completed a 220,000-volt line from Paugan Falls to connect at Chats Falls with the line to Toronto and a 110,000-volt line from the Farmers plant to connect with the Ottawa and Eastern Ontario hydro system, while a 110,000-volt line is being constructed between the Bryson plant and Hull, Quebec.

The Shawinigan Water and Power Company has added a 43,000 unit (No. 7) in No. 2 Shawinigan plant, bringing the capacity of this plant to 178,500 horsepower. No. 8 unit of the same capacity is being installed to be in operation next March.

The Shawinigan Company, whose total installation in various plants is rapidly approaching 700,000 h.p., has during the past year acquired the lease for an important power reach on the St. Maurice

River, involving a total descent of nearly 650 feet, with a projected installation of 1,000,000 h.p. at three or four sites. Extensive detail surveys are now being carried on to prepare plans for the developments, the first of which is to be in operation in 1933.

The Quinze Power Company has added two units of 10,000 h.p. each to its plant on the Quinze River, Upper Ottawa, the total installation now comprising four units.

On the Saguenay River, the Duke-Price Power Company has added unit No. 11 of 45,000 h.p. to the Isle Maligne plant.

At Chute-á-Caron, on the same river, construction was actively pursued throughout 1928 on the hydro-electric development of the Alcoa Power Company. The development is being carried out in two stages. The initial development, which is now under construction, will consist of four 65,000 h.p. units, for operation under a head of 150 feet. The contract has now been let for these units. The second development will have an installed capacity of approximately 1,000,000 h.p. and will operate under a head of 205 feet. Water for the second development will be supplied by a canal from the dam of the initial development. The initial development is scheduled to be completed by July 1, 1931.

Other installations placed in operation during 1928 include an addition of 2,400 h.p. by Ayers Ltd. on the North River at Lachute; a 1,050 h.p. hydro-electric plant completed for the Cie Electrique de La Sarre on La Sarre River, near the town of the same name; another of 800 h.p. on Belle River in the Saguenay district for the St. Jerome Light and Power Company; a 760 h.p. addition to the site of Sherbrooke Water Works plant on the Magog River; the addition of 182 h.p. by the Barrett Company, Ltd., at the former McArthur site on Assomption River at Joliette; the Cie Electrique Ste. Catherine's 150 h.p. plant on the outlet of Lake St. Joseph at Ste. Catherine; and the Cie Electrique de Charleviox's 140 h.p. plant on Boudreault Creek at Les Eboulements wharf.

Among other projects under active construction may be mentioned the Montreal Island Power Company's development on the Riviere des Prairies near Montreal, where work is well advanced on the power house, spillway and extensive headworks, the plant to be in operation by October of this year with an initial installation of 6 units each of 8,800 h.p. under a head varying between 18 feet and 26 feet, while the ultimate installation is to be nine or ten similar units.

Preliminary construction operations are also under way for the James Maclaren Company's extensive project on the Lievre River, comprising a hydro-electric plant at High Falls, having an initial installation of 90,000 h.p. and ultimately 120,000 h.p. The project also includes a 25 billion cubic feet storage reservoir at Cedar Rapids and a 250-ton pulp and paper mill at or near Buckingham.

Prospective developments in Quebec include a 30,000 h.p. plant at Chats Falls, on the Ottawa River; the City of Montreal's 15,000 h.p. development from the Lachine Rapids on the St. Lawrence; a 250 h.p. development by the St. Lawrence Paper Mills on Trinity River; a 375 h.p. hydro-electric plant on Coaticook River near Dixville; another on Hall River near Bonaventure, Quebec, and a 287 h.p. addition to the Regent Knitting Mills at St. Jerome.

In Ontario the activities of the Ontario Hydro-Electric Commission have included the installation of 1,800 h.p. at the Elliott Chute development on the South River, which will be placed in operation this coming Spring, and a plant at Trethewey Falls on the South Muskoka River, where a 2,300 h.p. unit will be placed in service about the same time. In early prospect is an addition of the tenth unit of 58,000 h.p. at the Queenston-Chippawa development, resumption of work at the 54,000 h.p. plant at Alexander Falls on the Nipigon River, and a new plant on the Musquash River. In the western end of Ontario the province is building a storage dam at the outlet of Lac Seul which is being constructed by arrangement between the Dominion and Ontario Governments for the purpose of providing storage to increase the regulated flow of the English and lower Winnipeg Rivers.

Other Ontario developments are: The 56,250 h.p. development of the Spruce Falls Company, completed in 1928, at Smoky Falls on the Mattagami River for use at the company's pulp and paper mills at Kapuskasing; the 28,200 h.p. station of the International Nickel Company of Canada at the Big Eddy dam on the Spanish River, which should be completed next May; the Calm Lake development by the Ontario and Minnesota Paper Company on the Seine River, where 13,200 h.p. was installed and placed in operation last June, and the 2,000 h.p. plant of the Dryden Pulp and Paper Company near Dryden, which was placed in operation during October.

In Nova Scotia work is proceeding on a $4,000,000 power development on the Mersey River for the news print mill to be established there. In New Brunswick the International Paper Company completed during the year an 80,000 h.p. installation at Grand Falls, on the St. John River.

Large power developments have also been carried out during the year in Manitoba and British Columbia, and still larger ones are under way.

A Call for Forest Conservation

The Hon. Charles Stewart, Minister of the Interior for the Dominion, has issued a call for a nation-wide stock-taking of the Canadian forestry industry, so that forest resources may be conserved and any recurrence of the over-production in the paper making branch of forest industries avoided. In this report he says: "The occasion demands serious consideration of the whole basis of pulp and paper manufacture, having regard on the one hand to market requirements, present and prospective, and on the other hand to the availability of supplies of raw material adequate to insure perpetuation of the industry. While the solution of forestry problems underlying the raw material situation is primarily a function of those eastern provinces in which the pulp and paper industry has reached its greatest development, nevertheless, the matter has in its broader aspects a national significance and must, therefore, cause the Federal Government some concern. Indeed, the situation transcends the bounds of a Canadian problem and assumes imperial importance, as is evidenced by the attention paid to it by the Third British Empire Forestry Conference which met in Australia and New Zealand last summer. From the Empire standpoint, considerable danger looms in the future from the impending world shortage of soft woods, and the Empire Forestry Conference has initiated investigations looking for substitutes to fill the gap even at enhanced prices. In this situation there is both a warning and an encouragement for Canada; a warning that we should conserve our remaining soft wood supplies by wise use and by protection from needless destruction by fire; an encouragement in that, so conserved and available, they will play in the future an even greater role than in the past in increasing and sustaining our national prosperity.

"With these considerations in mind the Dominion Government, despite some opposition, has resisted, during the past few years, persistent demands for the granting in Manitoba of additional pulpwood concessions on a large scale. The Federal policy has been to go slowly in this matter until it could be demonstrated that the pulpwood resources and the markets for paper warranted a further increase in productive capacity of the industry in Canada. The wisdom of this policy has been amply justified during the past year. There is now general realization of the fact that the utilization of our forest resources on a permanently productive basis involves also the operation of the industries concerned therewith under conditions which will provide a reasonable return to the capital and labor employed and to the public who own and control the forests.

"During the past summer a meeting was held in Winnipeg at which representatives of the Department of the Interior, the Manitoba Government, and the pulp and paper companies were represented, and as a result the regulations governing the sale of timber on Dominion lands are being revised with the view of restrict-

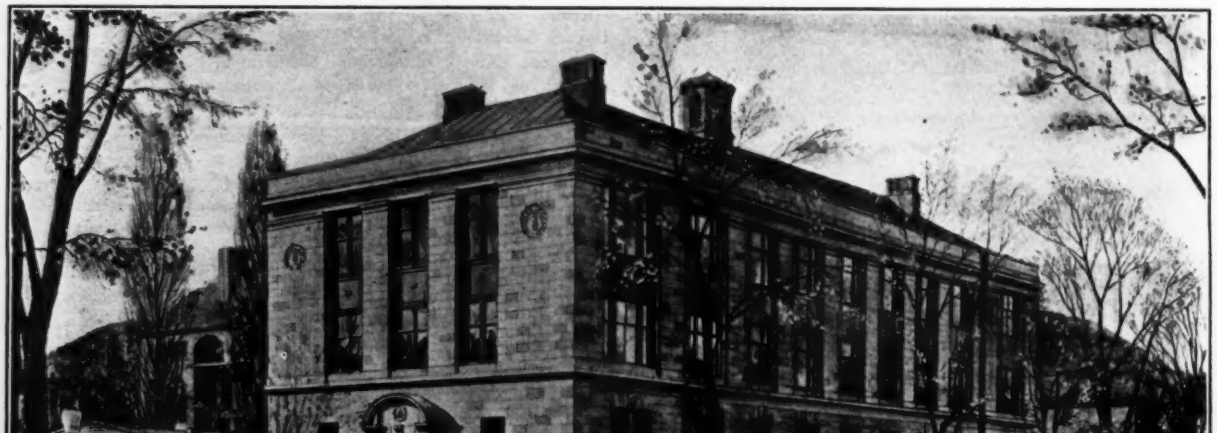
ing the annual cut of pulpwood to the current requirements and conserving the supply for future demands. Apparently similar action is under consideration by several provincial authorities.

"The value of the forests should not be gauged by the direct revenue they yield," says Mr. Stewart, "but rather by the contribution they make to the prosperity of the nation. Practically every industry is dependent to a greater or less extent on the products of the forest. Agriculture derives perhaps more benefit than most of the other industries, since the value of the forest products from the farms amounts to about $75,000,000 and, in Eastern Canada especially, the woods operations furnish a large proportion of the rural population with remunerative labor and markets for farm products. The products derived annually from the forests of Canada are valued at about $475,000,000, and it is safe to say that at least $450,000,000 of this is distributed throughout the Dominion for labor, equipment and supplies. In the fiscal year ending March 31, 1928, the exports of forest products were valued at $283,404,649 and imports at $36,918,883, leaving a favorable trade balance of $246,485,766. In our trade with the United States the balance in our favor was $206,144,230.

In closing, Mr. Stewart sounds a note of warning that "the time has come in Canada for a national stock-taking of our forest resources, and a review of our forest-management policies. The struggle to retain and expand present markets for forest products must not blind us to the fact that there is a serious difference between, on the one hand, legitimate 'production-and-marketing' campaigns—in short, healthy competition—and on the other hand, unwise exploitation with consequent waste not only of financial resources but of natural resources as well. For nothing will show quicker the result of skimped management than our forest wealth. So long as the wood-using industries are on a sound working basis they can be relied upon, through the revenue they produce, to bear the major cost of forest conservation and forest fire protection. Under these conditions only may we hope to prepare our forest estate for the future demands of a wood-hungry world, that Canada may reap full benefit from the ability to fill the need."

One of the dreams of leaders in the pulp and paper industry in Canada were realized during the period under review, for the end of the year witnessed the virtual completion of the Pulp and Paper Research Institute in Montreal, while the beginning of this year witnessed its formal opening as part of the ceremonies attending the annual meeting of the Canadian Pulp and Paper Association this month. The Institute is equipped in a thoroughly adequate manner for dealing with research work, its extensive equipment including a model paper mill for experiments. While the cost of the building itself has been defrayed by the members of the Pulp and Paper Association, the organization represents a co-operative effort on the part of the Association, the Dominion Government and McGill University, and it is under the staff of the latter that the research work will be carried on. It is expected that the institute will definitely place Canada in the forefront as far as the scientific aspects of the pulp and paper industry are concerned.

Two outstanding figures in the industry disappeared during the year by the death of I. H. Weldon, of Toronto, and G. H. Milleen, of Ottawa. The former who was one of the first presidents of the Canadian Pulp and Paper association, was at the time of his death, president of the Provincial Paper Mills, Ltd., and was a pioneer in the industry in this country. Mr. Millen, who for years had been president of the E. B. Eddy Company, of Hull, had done perhaps more than any other man to make the pulp and paper industry a many-sided one, for practically every kind of article made from wood pulp, from buckets to news print, was turned out by the company under his direction, which company was in large measure a monument to his ability. Almost till his death, in his 90th year, he was full of energy and initiative. Col. Ch. L. Jones, writing as president of the Canadian Pulp and Paper Association, stated quite truly that "these two men had witnessed the growth and development of the pulp and paper industry in Canada from very small beginnings and had contributed largely to that development. Their interests were wide-spread, both in the industry and in other spheres of activity, and their passing is a matter of deep regret to the industry and to the Dominion."



PULP AND PAPER RESEARCH INSTITUTE OF CANADA

Established at McGill University, Montreal, by the Canadian Pulp and Paper Association, and opened on January 25 by His Excellency Viscount Willingdon, governor-general of Canada, on the occasion of the sixteenth annual meeting of the Association. The building accommodates the McGill Department of Industrial and Cellulose Chemistry, the Pulp and Paper Division of the Forest Products Laboratories (owned by the Dominion government), and the headquarters of the Association. Its equipment includes a complete experimental paper mill, equipped to produce actual paper from raw pulpwood, including all the different processes together with the necessary laboratory machinery and appliances for carrying on industrial and scientific research for the paper industry. It is the first institution of its kind in which a government, a university and an industry have pooled their interests for the purpose of furthering scientific investigation and is the only instance in Canada of such an institution being established by a trade association. It represents an investment of $500,000.

Ontario Paper Industry Expands Considerably

Several New News Print Plants Came Into Operation and With Addition of New Machines Added to Existing Mills Productive Capacity Was Greatly Increased—Expansion Has Proceeded At More Rapid Rate Than Consumption and Manufacturers Were Forced to Operate on Reduced Schedules—Co-operation of News Print Manufacturers Should Overcome Many of the Difficulties and Strengthen the Industry.

Written Especially for the Annual Number of the Paper Trade Journal by G. W. Brock

THE wholesale end of the paper industry in Toronto and throughout the Province of Ontario experienced a satisfactory volume of business during 1928 and in some lines there was a much larger turnover than in the previous year. The coarse paper trade was perhaps a little less active, but fine papers, chiefly book, and to a lesser extent coated, had a big sale, and most firms registered a much larger tonnage than in 1927, with correspondingly increased profits. Some of the Toronto distributors, however, report that while they sold more paper in 1928 their profits, as far as bonds and writings go, were less, largely owing to a price war which developed in the summer and lasted a couple of months. Had this contingency not arisen there is little doubt that sales and profits in the marketing of fine papers would have created a new record. As it was, a good volume of business was recorded by practically all the paper houses and the snappy manner in which the new year has opened up on all lines of paper, with the exception of news print, is considered a guarantee of good business for the first quarter of 1929 at least. The paper box industry never had a better year and sales of board by Ontario mills surpassed in volume any previous year. Two new board mills, the Canadian Paperboard Company and the one constructed by the Dominion Envelope and Carton Company, on the Toronto water front, came into production during the latter part of the year.

Great Expansion in the Industry

In the pulp and paper industry throughout the country as a whole, the year was marked by great activity and considerable expansion. The high level maintained by business generally in Canada was reflected in an increased demand for pulp and paper products, while continued prosperity in the United States resulted in larger shipments of news print and chemical pulp. It is true that the news print industry is passing through its trials just now but there is a good deal of confidence that the industry will quickly get back again to a normal basis. The manufacture of news print is the most important branch of the industry in Canada and up to the time of the present impasse it had witnessed considerable development and expansion.

Several new mills came into operation during the year, new paper towns were established at Spruce Falls and Dolbeau, new machines were added to existing plants and the productive capacity of the news print mills was considerably increased. The expansion, however, has proceeded at a more rapid rate than the consumption of news print and in spite of the fact that production surpassed all previous records, the mills were forced to operate on reduced schedules. Many reorganizations and consolidations took place during the year which will be effective in bringing about economies in operation, and it is expected that co-operation on the part of the manufacturers will overcome some of the difficulties and result in a further strengthening of the industry.

Fine Papers Had a Good Year

Grades of paper other than news print find their principal outlet in the domestic market, and the mills making these grades have benefitted from the satisfactory business conditions prevailing throughout the Dominion in the past year. Production of fine papers—writing, bonds, ledgers and specialties—has been on a larger scale than in the previous years, and there was also a much larger production of book papers, practically all of the mills having operated close to capacity throughout the year. Development of the book paper branch of the industry has been retarded to some extent by increased importations of this grade of paper made possible by a change in the Canadian tariff permitting a drawback of 80 per cent of the duty on paper imported for use by magazines and periodicals.

Canadian mills are now equipped to manufacture practically every grade of paper in demand, and "Made-in-Canada" products are considered equal in quality to those made in other countries. There is still, however, a considerable importation of paper and paper goods into this country, amounting in the last fiscal year to close on $12,000,000. The manufacture of these goods in Canada would mean large outlays for machinery, wages and in other directions which would be of substantial benefit to the people of the Dominion.

Fine papers are not exported from Canada to any great extent, as tariff walls and European competition are formidable obstacles to the development of foreign markets. Australia, New Zealand, and Great Britain are Canada's best customers for these grades, but shipments in 1928 were somewhat smaller than in the previous year. Wood pulp production during the year increased in proportion to the larger output of paper for which it forms the raw material. In the case of sulphite pulp there was also a fair increase in exports, but for mechanical pulp a lessened demand from overseas markets and from the United States, resulted in a decrease of shipments to those countries. Canada now manufactures a good proportion of the wood pulp used in the artificial silk industry, and Canadian pulp for this purpose is exported in constantly increasing volume. The greater portion of Canadian wood pulp of all kinds goes to the United States, and shipments to that country in the first ten months of the year amounted to 592,488 tons out of a total export of 707,494 tons.

Export Trade a Big Factor

As a factor in the export trade of Canada pulp and paper occupy an important place, and contribute very largely to the maintenance of a favorable trade balance. In the first ten months of the past year Canadian exports of wood pulp and paper were valued at $157,889,459, as compared with $144,775,700 in the corresponding months of 1927. The exports of wood pulp showed some decline from last year's figures, the total value for the period being $37,655,890, while in the ten months of 1927 the value was $39,034,429. This decline, however, was more than offset by the increased value of the paper exports, which increased from $105,737,271 in 1927 to $120,233,569 in 1928.

Investment Exceeds Half Billion

The importance of the pulp and paper industry in the industrial and economic life of the Dominion and the rapid progress made by the industry in the past ten years may be gathered from the report published during the year by the Dominion Bureau of Statistics giving a census of the industry for 1927. In that year

the capital investment in the industry was given as $597,854,000; the total in 1917 was $186,787,000, or less than one-third of the more recent figures. The 1927 total included only those mills in actual operation, but since that time many new projects have been completed and several others are under way, so that the total capital investment now stands at a much higher figure than that recorded for 1927. The industry in that year gave employment to 32,876 persons, and the amount paid out in wages and salaries was $45,674,000, these figures being exclusive of woods operations, which at certain seasons of the year provide employment for a much greater number of men than is employed in the mills. The industry is also the greatest single user of hydro-electric power, and the paper companies have played a prominent part in the development of water power in most of the provinces of the Dominion.

Progress Made in Research Work

While this development has been proceeding, the industry has not lost sight of the fact that progress is largely based upon scientific knowledge and research, and one of the most important events of the year has been the establishment of the Canadian Pulp and Paper Research Institute at Montreal. This building, erected and endowed by the industry, and operated conjointly with McGill University and the Department of the Interior, is now completed, and was officially opened by the Governor General on January 25. The building contains the executive offices of the Canadian Pulp and Paper Association, and accommodation for the work of industrial cellulose chemistry of McGill University, and of the Forest Products Laboratories of Canada. Here will be carried on investigative and research work leading to a more complete and scientific utilization of the country's forest resources, and the solution of the many problems facing the industry in converting those resources into paper and other products. Its construction indicates that Canadian pulp and paper manufacturers are fully alive to the necessity of fundamental research and the application of scientific principles to industry.

Paper Companies' Timber Limits

Ontario's Hinterland, formerly known as New Ontario, and extending from the Quebec boundary to the boundary of Manitoba, is covered largely by forests. On the north the boundaries have been enlarged to include Patricia, an enormous territory, which today is the real "New Ontario." The forests are comprised chiefly of pulpwood and the construction of the two transcontinental railways, the Temiskaming and Northern Ontario Railway and the Central and Eastern Algoma railroads, has made these readily accessible. It is not surprising, therefore, that in view of the rapid growth in the pulp and paper industry and the insistent demand for timber limits, a large production of the area has been taken up by pulp and paper companies to insure an adequate supply of raw material for the numerous paper mills that are operating or are projected in the province. Companies occupying an important position with respect to timber limits in Ontario include the Abitibi Power and Paper Company; Spruce Falls Power and Paper Company; Great Lakes Paper Company; Canadian International Paper Company; Thunder Bay Paper Company; Dryden Paper Company, and the Backus limits at the extreme west end of the province. The Booth limits are located north of the Sudbury district.

The individual limits held by the Abitibi Power and Paper Company are numerous and large in size. Between Lake Nipigon and the Quebec boundary this company has eight large blocks, in addition to a number of smaller limits, while it has one large block and a series of ten smaller units on the west side of Lake Nipigon. The Abitibi company, with its subsidiaries, has six units engaged in the manufacture of news print paper and associated products, two of these being located in Quebec, one in Manitoba, and three in Ontario. These have a combined capacity of 650,000 tons and are capable of expansion to 1,000,000 tons a year from present timber limits and water power resources. Total wood reserves are in excess of 50,000,000 cords. The Spruce Falls Power and Paper Company's limits located north of the C. N. R. at Kapuskasing, comprise not less than 10,500,000 cords of pulpwood, while the news print mill, which is now in operation, when completed, will have a capacity of 500 tons per day.

The pulpwood limits of the Dryden Paper Company comprise approximately 6,000,000 cords and are situated near the western boundary of Ontario. Provincial Paper limits, which are located close to one of the company's mills, at Port Arthur, comprise 2,500 square miles. This company manufactures finer grades of paper than news print. The Thunder Bay Paper Company, which is now under control of interests identified with Abitibi and Canada Power and Paper Companies, has limits comprising 2,000 square miles immediately east of Lake Nipigon. The Backus interests have two very large blocks of timber limits in the Lake of the Woods district adjacent to the Manitoba boundary where it is proposed to build a mill with a capacity of 100,000 tons per annum. Possibly construction will be delayed until conditions in the news print market improve. The Great Lakes Paper Company, Ltd., has two timber limits, one to the east of Lake Nipigon, and the other on the north shore of Lake Superior, to the east of the Nipigon River. These limits combined have sufficient pulpwood to maintain a mill with a capacity of 200,000 tons annually for 50 years.

CROWN ZELLERBACH BUILDING

The sale of an eight-story office building in San Francisco to the Crown Zellerbach Corporation has just been recorded and after complete remodeling and modernizing, including the probable addition of four stories, the general executive offices of the Crown Zellerbach Corporation will be centralized in this building. The building will be known as the Crown Zellerbach Building.

Three floors will be devoted to executive headquarters of the corporation and not less than one floor will be devoted to the general sales offices of the Crown Willamette Paper Company and the San Francisco sales offices of the National Paper Products Company.

The Crown Zellerbach Corporation is a holding company which owns certain operating companies, among which are Zellerbach Paper Company, Crown Willamette Paper Company, Washington Pulp and Paper Corporation and several other timber holding and power companies.

Each of these companies operates independently on policies established by the executive offices of the Crown Zellerbach Corporation.

The executive offices of the Zellerbach Paper Company will remain at 534 Battery street.

The following executive officers of the Corporation will have their offices in the Crown Zellerbach Building: Isadore Zellerbach, president of the Corporation; Louis Bloch, chairman of the board; M. R. Higgins, chairman of the executive committee; E. M. Mills, A. B. Martin and J. D. Zellerbach, executive vice-presidents; Harold L. Zellerbach, vice-president; D. J. Goldsmith, secretary; S. Sonnenberg, treasurer.

TO BUILD ELECTRO-CHEMICAL PLANT

Approval of a new bond issue by residents of this city makes it reasonably certain that the Carlisle Corporation, which controls the St. Regis Paper Company, will begin construction of its proposed electro-chemical plant in a few weeks. The new plant will use a vast amount of water and plans have been held in abeyance pending the ability of the city water department to furnish an adequate supply of manufacturing establishments in the new industrial area. The proposition calls for the issuance of bonds by the city to the amount of $100,000 and the proceeds will be used in installing electrically driven pumps in the city pumping station and improvements to the present distributing system. At the special election held here last week the vote was 871 in favor of the measure and 532 against it.

Big Dinners During Paper Week

Paper Manufacturers, Merchants and Salesmen, and Technical and Cost Men Hold Banquets and Luncheons at New York Hotels.

Annual Banquet of American Paper and Pulp Association Was Last Dinner of Organization To Be Held at Waldorf-Astoria Hotel and Was Notable for Being One of the Most Brilliant and Successful Events Ever Held During Its History—Affair Provided Marked Change From Serious Programs to Which Members Had Become Accustomed, as Addresses by the Leading Speakers Were Mainly in Humorous Vein.

APPROXIMATELY one thousand members and guests of the American Paper and Pulp Association assembled at the Forty-Second Annual Dinner of the organization in the Grand Ball Room of the Waldorf-Astoria Hotel on Thursday night, this notable event winding up an exceptionally interesting paper convention. Incidentally, there was a general air of regret apparent in the gathering, due to the fact this marked the last occasion on which the members of the association will be able to dine at this famous and world-renowned hostelry, which is to be demonished in the near future.

Promptly at 7:30 p. m., the members and their guests marched from the Astor Gallery, where the reception had been held, to the banqueting hall and proceeded to locate their tables. After the Star Spangled Banner had been played by the excellent orchestra, the assembly took their seats and proceeded to enjoy the splendidly served dinner provided for the occasion, which consisted of Sterling Oyster Cocktail, Gumbo Soup (Southern Style), Celery, Olives, Filet of Sea Bass, Gratinee, Potatoes Royale, California Asparagus, Hollandaise, Supreme of Chicken, Tyrolienne, Waldorf Salad with Sweet Peppers, Bombe Wettin Ice Cream, Assorted Cakes, Macaroons, Coffee, White Rock, Johnny Walker Cigarettes and Cigars.

The artistic menu and program contained names and connections of the officers and executive committee of the American Paper and Pulp Association; the Banquet Committee and the Reception Committee, and the names of the Past Presidents from the inauguration of the association in 1878 to the present day.

D. C. Everest Presides

D. C. Everest, the hard working and popular retiring president of the association, was toastmaster and seated with him at the speakers table were M. W. Alexander, Henry W. Stokes, A. B. Daniels, W. J. Raybold, Judge W. E. Humphrey, S. L. Willson, Sir John Edmiston, the Rev. Dr. Nehemiah Boynton, Felix Pagenstecher, Dr. Emil Heuser, H. W. Mathewson, "Senator" Edward Ford, Norman W. Wilson and George W. Sisson, Jr.

After a few timely and well chosen remarks, Mr. Everest introduced several of the noted guests and afterwards read a letter from Judge Moore, an old and respected friend of the association, who expressed his regret at being unable to attend the function.

In his communication Judge Moore referred feelingly to his long association with the industry and expressed his appreciation for the loyalty and affection of his innumerable friends. He concluded by conveying his very best wishes for the peace and prosperity of the American Paper and Pulp Association and its members.

When Toastmaster Everest introduced the newly-elected president of the American Paper and Pulp Association, S. L. Willson, of the American Writing Paper Company, Holyoke, Mass., this gentleman was cheered to the echo by the large audience, plainly showing the esteem and confidence of the members.

The addresses made at the annual banquet this year offered a marked change from the serious programs to which the members have hitherto been accustomed. Toastmaster Everest introduced the first speaker of the evening, Senator Ford of Michigan.

Senator Ford said that although he was assembled in Michigan he was not put together in Detroit. He caused considerable amusement by his witty allusions to Henry Ford, the automobile manufacturer, but disclaimed any relationship to him. After referring to the fact that King Henry the Eighth discarded his Elizabeth, he made many witty wise-cracks about the old Tin Lizzies and about Mr. Ford's recent aeroplane activities.

Mayor Jimmy Walker was described by Senator Ford as New York's traveling salesman and he recommended Ex-Governor Smith to run for the office when Mayor Walker retired as New York's wise-cracking chief magistrate had shown future mayors how the office provided opportunities for extensive travel, both in this country and abroad, wide observation, and recreation.

Senator Ford also referred to the activities of the handsome and polished new Police Commissioner, Grover Whalen. He was not surprised that the first thing that Mr. Whalen did on taking up his post was to dissolve the "Homicide Squad," as he declared they had not solved a murder since the Shooting of Dan Magraw.

Modern Woman Discussed

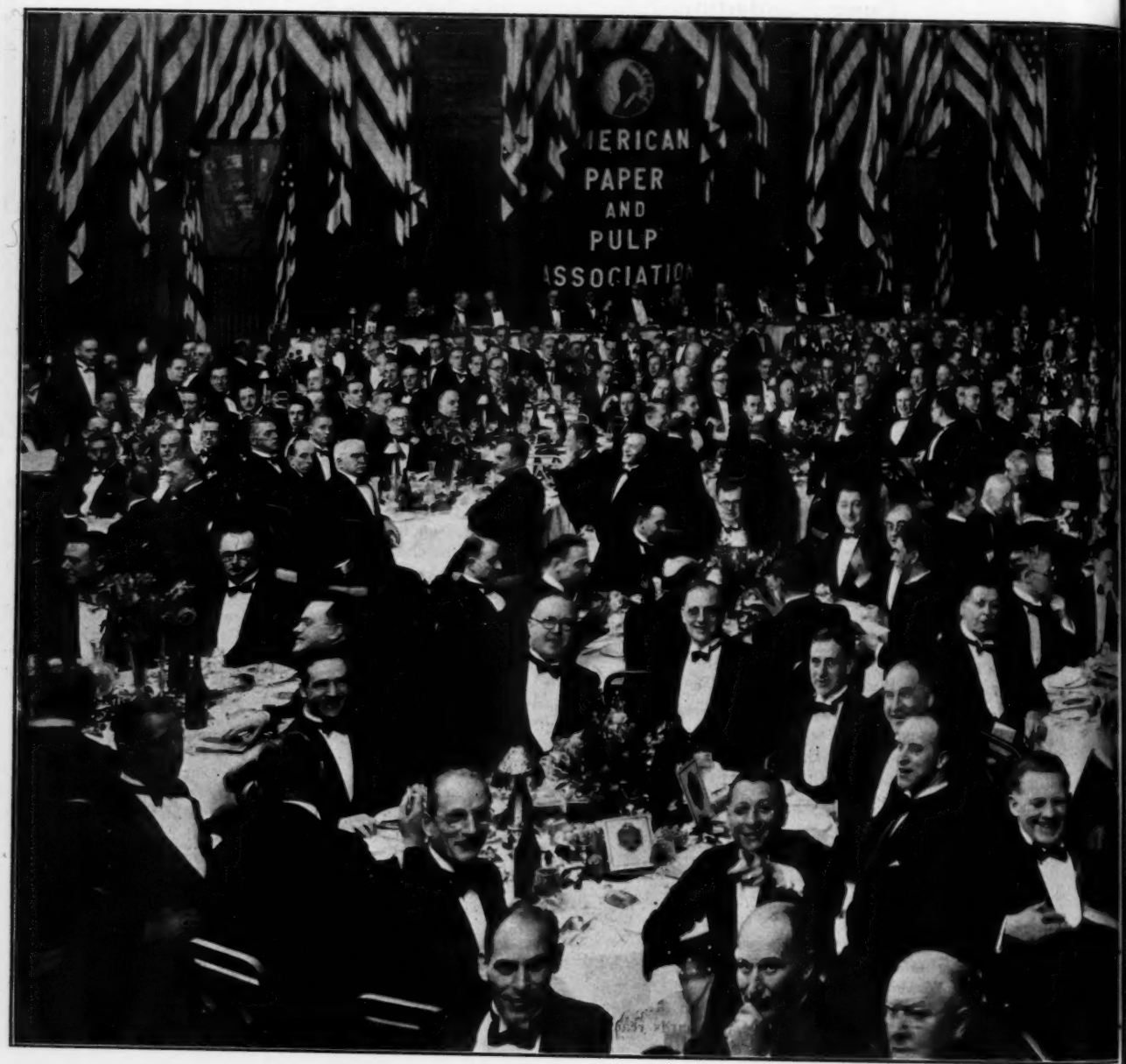
He proceeded to discuss the modern woman. Nowadays, Senator Ford declared, the only difference between mother and daughter was the fact that the daughter got tired first. He said that in the olden days the man who hid behind a woman's skirt was branded as a coward. "Nowadays," commented Senator Ford, "he was a magician."

"Modern Woman, when showing signs of age and wear, went to a Beauty Parlor and came out completely renovated. Everything was new except the *chassis*.

Senator Ford also made a few pointed remarks about the crime wave in Chicago. He had just heard of a bank robbery in the "Windy City" and stated that already the police had a complete and detailed description of the bank. Speaking of the work of the gun men he declared that it is rumored in Washington that the Nicaraguan Government had threatened to intervene if the situation did not soon show signs of improvement.

Prohibition was also discussed by Senator Ford. He said that when someone complained to President Lincoln about General Grant drinking too much liquor of a certain brand, the Great Emancipator replied, "Tell me the name of the brand General Grant drinks and I'll supply it to all my other Generals."

Senator Ford also stated that George Washington must have taken at least one drink as otherwise he would not have stood up in a row boat when crossing the Delaware River.



PICTURE TAKEN AT THE FIFTY-SECOND ANNUAL BANQUET OE THE AMERICAN PAPER AND PULP ASSOC

ASSOCIATION AT THE WALDORF-ASTORIA HOTEL, NEW YORK, THURSDAY EVENING, FEBRUARY 21, 1929

The Fifteen Cruiser Bill was also discussed by Senator Ford. He did not see why we required fifteen cruisers when we had nothing suitable to christen them with. "How can you expect the crews to show the proper fighting spirit on warships christened with ginger ale," commented the Senator.

Sir John Edmiston's Pungent Remarks

Toastmaster Everest then introduced the next speaker as Sir John Edmiston, a distinguished Scottish journalist and proprietor and editor of the *Glasgow Chronicle*. Sir John was said to have come to this country three years ago as an unofficial observer with the British Industrial Commission and later with a party of British journalists brought here under the auspices of the Carnegie Foundation for Peace.

Sir John spoke with a burr that could be cut with a knife and made many pungent comments—both serious and witty—on American Life and Americanisms. He ended his discourse by singing "Annie Laurie" in a rich tenor voice and with great feeling, and literally brought tears to the eyes of many in the audience, but the gathering was astounded at the conclusion of his song when he doffed his disguise and disclosed his true identity as being John E. Daniels, of Boston.

The celebrated and world renowned "Oscar," who has been connected with the Waldorf-Astoria Hotel for so many years also spoke and expressed his deep regret that the American Paper and Pulp Association would not be able to hold any more of its banquets at the famous hostelry, where the annual event has been housed for so many years past.

The Rev. Nehemiah Boynton, long the chaplain of the association, made one of his characteristic talks to his friends in the paper industry and closed the banquet and the convention by pronouncing the Benediction.

In conclusion, the great success of the Forty-Second Annual Dinner was due in no small measure to the very hard work of the Banquet Committee, consisting of F. A. Leahy, chairman, Leigh H. Davey, A. S. Guggenheimer, Arthur Havemeyer, Frank McAllister, Henry W. Stokes, John B. Van Horn and Kendall Wyman.

TECHNICAL ASSOCIATION BANQUET

The dinner of the Technical Association of the Pulp and Paper Industry at the Hotel Commodore on Wednesday evening proved one of the most enjoyable events of the fourteenth annual meeting. Those present, and it was a goodly number of members and guests, thoroughly enjoyed the very apt remarks of the toastmaster, E. C. Tucker, president of TAPPI. And, there was dancing.

The speakers of the evening, Howard C. Parmelee, editorial director of the McGraw-Hill Publishing Company, and Gill Robb Wilson, Past National Chaplain of the American Legion, must have added much to their reputations as orators, for they held the close and undivided attention of all within reach of their voices from first to last. Their remarks were good to hear, illuminating and instructive and very much to the point.

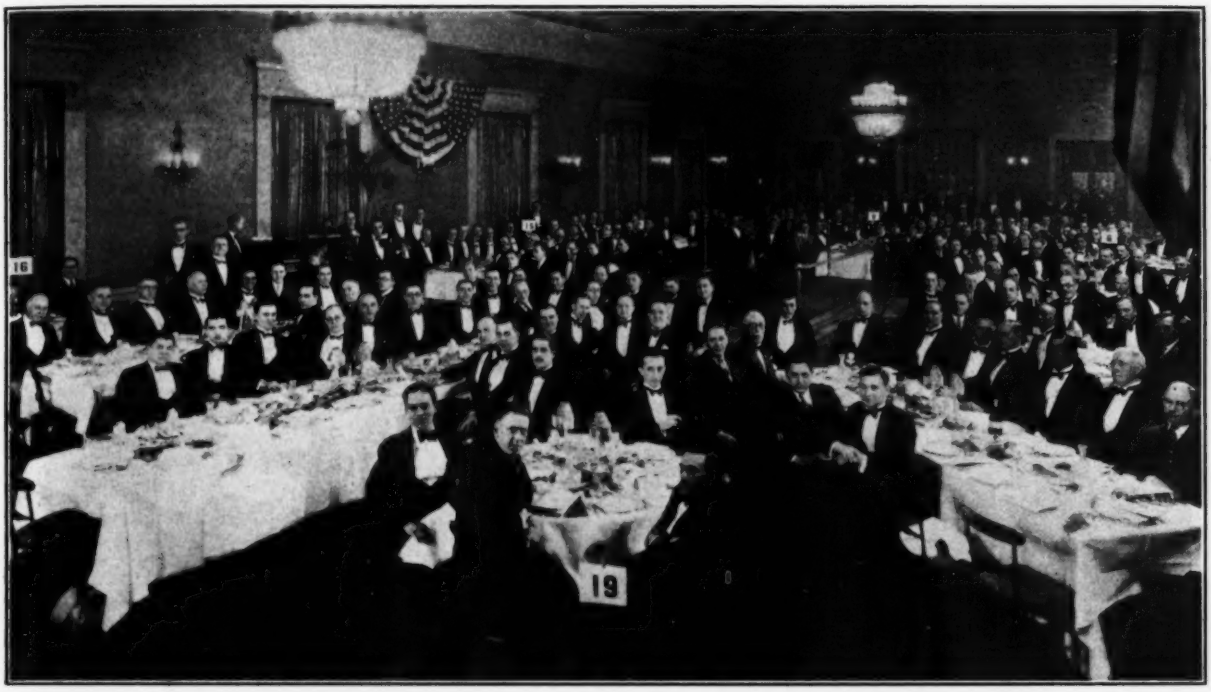
Mr. Parmelee took as his subject "What's ahead for the technical man," presenting first a vivid picture of the wealth of scientific, technical and economic knowledge the trained engineer now brings to industry, the achievements of science which the technical man by virtue of his powers of observation, analysis and imagination can best fit and adopt to the needs of business and commercial pursuits. He enlarged upon the worth of technical research and the part it plays and will play more and more in industrial development.

That combination of economic and technical knowledge which is distinctive of the qualifications of the engineer should, he pointed out, make the technical man in great demand for executive and managerial responsibilities, for the handling of marketing problems and in planning and directing business. The ability of the engineer to carry the methods of science into business, to eliminate guesswork and to shape policies which provide and anticipate the future calls upon him to finish the work he has as yet only half, though most ably, completed.

It was a stirring message to the technical men of the industry, calling upon them to step forward and expose themselves to business growth, to advance and to assume the initiative. It was also an important message to the present executives.

The Reverent Gill Wilson made a great speech, with all the fire

BANQUET OF THE TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY. HOTEL COMMODORE



BANQUET OF THE NEW YORK ASSOCIATION OF DEALERS IN PAPER MILLS' SUPPLIES, COMMODORE HOTEL

and enthusiasm which has made him so beloved by all who have been privileged to meet and associate with him. His was a message of good will, of progress and promise which made a strong appeal and must have inspired all who were present to step out, assume the technical leadership and grasp the great opportunities awaiting and confronting them.

COST ASSOCIATION LUNCHEON

As usual, the annual luncheon of the Costs Association of the Paper Industry attracted a large and enthusiastic gathering, on Wednesday afternoon, at the Waldrof-Astoria Hotel. Colonel B. A. Franklin, of the Strathmore Paper Company, occupied the chair and made the opening address in his usual happy vein. He declared that the cost situation was the most important problem of the day to the paper industry and expressed the view that many more individual mills ought to pay more attention to this phase of the industry.

Dr. E. O. Merchant, statistician of the G. H. Mead Company, gave an interesting and informative address on "The Business Outlook for 1929." He said in part:

"Although the paper industry will enjoy an expanding volume of business in 1929 as it did in 1928, it will probably continue to be classed as a depressed industry because of low prices and vanishing profits. The troubles of the industry are not due to volume but to uncontrolled production and to unintelligent operation. In other words, the troubles are man made and therefore can be man cured.

"The efforts of the news print manufacturers in Canada to stabilize their industry and the more recent efforts of the boxboard mills in this country to reinstate the Washington agreement, which provided for five days of production, one day for clean up and repairs, and a complete Sunday closing, show that constructive efforts are already being taken in parts of the paper industry to improve conditions."

L. V. Estes, of L. V. Estes, Inc., paper mill engineers, of Chicago, Ill., was scheduled to talk on "Higher Wages—Lower Costs," but was unfortunately unable to speak, due to a throat affection. However, his able speech was read. Part of his address follows:

"More and more it is being realized in manufacturing circles that prosperity of mill and nation is dependent on the mutual trust and understanding of employees and employer. Therefore the slogan should be "Pay higher wages, eliminate excess of labor and thus reduce manufacturing costs." This thought is in the mind of every mill manager and superintendent.

"There is no plan or system that can be applied to every mill without adopting it and changing it to suit local conditions. Therefore, a careful analysis of existing conditions is the first step to success in any mill."

Mr. Estes outlined a desirable premium wage plan which can be modified and adapted to the conditions and requirements of the various departments throughout the mill and explained the advantages of such a plan.

Part of the creed of the reputable engineer is "To keep the faith of the client. He will not undertake what he knows to be beyond his ability; and that with respect to what he undertakes he will give conscientious service to the limit of his ability," concluded Mr. Estes.

PAPER SUPPLIES DEALERS BANQUET

The New York Association of Dealers in Paper Mills Supplies, Inc., held its twenty-first annual banquet in the East ballroom of the Commodore hotel on Wednesday evening, February 20, and an enjoyable and educational evening resulted.

The two hundred members and guests were provided with an excellent menu and an interesting entertainment by the efficient members of the banquet committee headed by Walter Martens the treasurer of the association.

Immediately following the banquet a short address of welcome was delivered by Bert Lorenz, president of the association.

Tables were reserved by Sol Ash, Inc., Atterbury Brothers, D. Benedetto, Inc., C. F. Bradley, Vito G. Contasano, Jas. Carrano & Son, Darmstadt, Scott & Courtney, Economy Baler Company, S. J. Fisher, Inc., Graccione Bros & Co., R. Goldstein & Son, Daniel M. Hicks, Inc., Hicks Costarino & Co., Inc., Gus A. Johnson, Inc., E. J. Keller & Co., Keeley & Co., Leshner Paper Stock Company, Chas. A. Mastronardi, Ernst Mayer, Inc., Geo. W. Millar &

PICTURE TAKEN AT THE ANNUAL BANQUET OF THE NATIONAL PAPER TRADE ASSOCIATION OF

THE UNITED STATES AT THE ROOSEVELT HOTEL, WEDNESDAY EVENING, FEBRUARY 20, 1929

Co., Inc., Mitchell Paper Stock Company, A. J. Moran & Co., Inc., National Association Waste Material Dealers, W. Steck & Co., Sterling Mill Supply Company, Walker Goulard & Plehen and the Whaling Waste Products Company.

The revue following the dinner was most excellently received. An interesting feature of the evening was the presence of Harry Armstrong, composer of the famous song "Sweet Adeline," who acted as master of ceremonies and introduced the members of the revue.

Considerable credit must be given to the committee members for their diligent efforts in the conduct of the banquet. This committee consisted of Walter H. Martens, chairman; Charles Passannante, Joseph Carrano, Louis Gottlieb, Alfred J. Moran and Fred H. Chase. The officers of the Association are Bert Lorenz, president; Andy C. Costarino, vice president; Walter H. Martens, treasurer; Alfred J. Moran, secretary.

THE PRESIDENT'S LUNCHEON

The annual luncheon given for former presidents of the American Paper and Pulp Association was held on Thursday afternoon at one o'clock. President D. C. Everest presided. This luncheon, true to tradition, proved particularly interesting, assembling as it does the official heads of the numerous associations related to the parent organization. Through informal discussion topics were pursued which applied to all the various phases of the industry. Those who attended the luncheon were:

D. C. Everest, Marathon Paper Mills Company, Rothschild, Wis.; S. L. Willson, American Writing Paper Company, Holyoke, Mass.; Felix Pagenstecher, Bryant Paper Company, Kalamazoo, Mich.; J. P. Hummel, Hummel-Ross Fibre Corporation, Hopewell, Va.; W. L. Carter, Nashua Gummed and Coated Paper Company, Nashua, N. H.; Norman W. Wilson, Hammermill Paper Company, Erie, Pa.; Henry W. Stokes, Land Title Building, Philadelphia, Pa.; W. J. Raybold, Rising Paper Company, Housatonic, Mass.; Geo. W. Sisson, Jr., Racquette River Paper Company, Potsdam, N. Y.; A. B. Daniels, L. L. Brown Paper Company, Adams, Mass.; Benjamin T. Larrabee, S. D. Warren Company, Cumberland Mills, Maine; R. B. Donnelley, Central Waxed Paper Company, Central avenue and Taylor street, Chicago, Ill.; Donald Lowe, Lowe Paper Company, Ridgefield, N. J.; Irving McHenry, Mid-States Gummed Paper Company, 2433 South Robey street, Chicago, Ill.; E. H. Naylor, Writing Paper Manufacturers Association, 44 Vernon street, Springfield, Mass.; J. H. Coy, Flambeau Paper Company, 111 West Washington street, Chicago, Ill.; E. C. Tucker, Chemical Paper Manufacturing Company, Holyoke, Mass.; W. H. Savery, Shenandoah Pulp Company, Hapers Ferry, W. Va.; Langdon B. Wood, M. H. Birge and Sons, Buffalo, N. Y.; D. K. Brown, Neenah Paper Company, Neenah, Wis.; W. N. Wilkinson, Supply and Equgipment Section, Incorporated, 18 East 41st street, New York City; W. Noble Gillett, Chicago, Paper Company, 801 South Wells street, Chicago, Ill.; Kit S. Warner, John F. Sarle, Incorporated, 50 Hudson street, New York City; E. B. Allen, Adams Bag Company, Chagrin Falls, Ohio; S. C. Knode, Albemarle Paper Manufacturing Company, 280 Broadway, New York City; H. W. Mathewson, Paper Supply Company, Minneapolis, Minn.; Breck Aspinwall, Oxford Miami Paper Company, W. Carrollton, Ohio; J. M. Ward, Detroit Sulphite Pulp and Paper Company, Detroit, Mich.; E. W. Kiefer, Port Huron Sulphite and Paper Company, Port Huron, Mich.; George H. Gardner, Menasha Products Company, Chicago, Ill.

NATIONAL PAPER TRADE BANQUET

The nineteenth annual dinner of the National Paper Trade Association of the United State, held Wednesday evening in the Grand Ball Room of the Hotel Roosevelt, proved one of the most enjoyable in the history of the association.

This important occasion had many distinguishing features, and, as had been anticipated, was one of the outstanding events of paper convention week. More than two hundred members and guests assembled and one and all thoroughly enjoyed the good things provided.

Preceding the banquet, a reception was held, after which the assemblage marched to the Grand Ball Room and lost no time in locating their tables. At each plate was an attractive and artistic menu, which contained the names of the former presidents since the formation of the association in 1904 and a list of the officers of the organization.

During and after the repast Ben Bernie's celebrated orchestra rendered popular dance selections with considerable aplomb, and dancing was enjoyed until the "wee sma' hours of the morning."

The indefatigable entertainment committee and all the officers and members of the National Paper Trade Association of the United States, have every reason to be gratified at the success of its nineteenth annual dinner.

BINDER'S BOARD LUNCHEON

The luncheon of the Binders' Board Manufacturers Association, held at the Waldorf-Astoria on Wednesday, was thoroughly enjoyed by those who attended. Discussion of matters of vital importance to the members of the organization took place.

Officers for 1929-1930 were elected as follows:

President, E. C. Betz, Consolidated Paper Company, Monroe, Mich.

Vice-President, E. H. Norton, C. H. Norton Company, North Westchester, Conn.

Treasurer, A. B. Goodrich, Riverside Paper Manufacturing Co., Glastonbury, Conn.

Secretary, O. M. Porter, 18 East 41st Street, New York City.

Executive Committee: Leigh H. Davey, The Davey Company, Jersey City, N. J.; E. H. Norton, C. H. Norton Company, North Westchester, Conn.; J. P. O'Brien, Otter River Board Company, Otter River, Mass.; E. C. Betz, Consolidated Paper Company, Monroe, Mich.; O. M. Porter, 18 East 41st Street, New York City.

WOODLAND SECTION LUNCHEON

The Woodland Section of the American Paper and Pulp Industry held an enjoyable luncheon on Wednesday afternoon in the Sun Parlor of the Waldorf-Astoria Hotel. There was an excellent attendance.

The special feature of the occasion was an excellent address by W. G. Howard, Superintendent of Lands and Waters, New York State Forest Service, on "Forestry in New York."

GROUND WOOD TAG LUNCHEON

The luncheon of the Ground Wood Tag Manufacturers, held on Wednesday afternoon at the Waldorf-Astoria, was voted a thoroughly enjoyable affair by those present. Matters pertinent to the Ground Wood Tag Manufacturers' interests were thoroughly discussed.

WAXED PAPER LUNCHEON

There was an excellent attendance of members at the annual luncheon of the American Waxed Paper Association on Tuesday afternoon at the Waldorf-Astoria Hotel. Various matters of vital interest to the welfare of the waxed paper industry were discussed and the exchange of views was most valuable to all present. All present voted the event a thoroughly enjoyable and instructive function.

PAPER MAKERS' ADVERTISING CLUB

The Paper Makers' Advertising Club held its luncheon at the Waldorf-Astoria on Wednesday afternoon. Numerous matters bearing upon advertising in the paper industry were taken up by members and profitably discussed.

GLAZED AND FANCY LUNCHEON

Members of the Glazed and Fancy Paper Manufacturers Association held their annual luncheon on Thursday at the Waldorf-Astoria. Discussion of matters of specific interest to the members took place.

MANUFACTURERS OF PAPER MEET

American Paper and Pulp Association Holds Fifty-Second Annual Convention at the Waldorf-Astoria Hotel, New York City

S. L. Willson, President of the American Writing Paper Co., Holyoke, Mass., Is Elected To Head the Organization for the Coming Year—Committee Advocates an Organization Built Around Some Outstanding Man of Wide Experience, Ability, Foresight and Vision With Well Known Executive Ability as General Manager—Committee Also Advocates Appointment of Traveling Secretary—Plan of Organization.

ONE of the most momentous meetings in the history of the American Paper and Pulp Association was the fifty-second annual gathering held in the Astor Gallery of the Waldorf-Astoria Hotel on Thursday. There was an excellent attendance when President D. C. Everest called the meeting to order at 10:55 A. M. The minutes of the fifty-first annual meeting were approved without reading. The Secretary-Treasurer's annual report, including the Standing Committee reports, printed and bound, were distributed to all present and were accepted without reading.

In an exceptionally important address, President Everest reviewed the work of the Committee on Development. He declared that the committee had done an excellent piece of work and urged that the matter be referred to the incoming administration with power to act. Mr. Everest said that the organization had a certain overhead budget which has reached an irreducible minimum, and told the members that if the association provided funds beyond actual overhead, that they can commence to show results, and that beyond certain fixed costs, any money contributed will yield substantial benefits.

President Everest also touched on the recent tariff hearings at Washington and explained the reason why a duty on news print was not asked for. He ascribed the removal of duty on news print during the Taft administration as responsible for most of the troubles of the industry today. Following the reciprocity treaty there was a great readjustment of grades. Old mills making news print went on to wrapping, book, writing and other papers. During the war, due to excessive demand, there was a breathing spell and this excess production was not badly felt, but with the cessation of the war it was found that these grades over produced. It has been a constant shifting of grades ever since the war. One after another, news print mills have gone on to other grades and there are yet more to follow. Mr. Everest expressed the view that it will take another five years to complete the re-vamping of the industry.

Perhaps the most important feature of the annual meeting was the report of the Committee on Development. The committee declared that the association was not now sufficiently representative of the paper industry, not sufficiently manned, nor authoritative enough, or well financed. They stated that the fault does not lie with those manufacturers who have in the past unselfishly and ably worked as officers and directors of the association, but rather is due to the fact that in the development of the association the lack of definite policies and adequate finances has hampered the carrying out of a full and complete organization.

The committee advocates an organization built around some outstanding man of wide experience, ability, foresight and vision, with well known executive ability as general manager. If he has trade association experience and a knowledge of and acquaintance in the paper industry so much the better. If such a man can be found there is no question of his value to the paper industry.

He would function under a board of governors, elected from the ablest leaders of the paper industry, with a president and vice-president. A general secretary would be responsible to attend to details of horizontal and vertical functions and to assist in the organization of trade groups, leaving the time of the general manager to be spent on the larger affairs.

S. L. WILLSON, PRESIDENT

The committee also advocates a traveling secretary who would both discover the needs of individual members by personal contact at their plants, and interpret to them the efforts and actions of the general association in his behalf.

Such general group should be adequately financed, probably in some rate of payment based on the volume of business done by individual mills. The committee recommends that the detailed plans of financing be left to the executive committee of the association, having in mind that the cost should be equitably distributed through the entire membership and the necessity that the dues be no higher than the value of the service warrants.

Realizing that with present conditions time will be necessary to accomplishment, the committee suggests that the plan of financing and the plan of organization be referred to the president and executive com-

mittee, with power to act as rapidly as may seem desirable and possible.

Norman W. Wilson, of the Hammermill Paper Company, said that after attending some of the meetings of the development committee and having thought deeply about the matter as work progressed, he became convinced that the plan is sound. He presented the following resolution, which was unanimously adopted:

WHEREAS, the paper industry has grown to such proportion that the interest of the members of the American Paper and Pulp Association can be safeguarded only through an effective organization, therefore, be it

RESOLVED, that the report of the Committee on Development be referred to the President and Executive Committee with power to analyze and consider its application to the industry's needs, and to take such action towards the consummation of a plan, as in their judgment will adequately meet the necessities of the industry.

H. W. Stokes, chairman of the nominating committee, reported that his committee had unanimously decided to nominate the following officers for the following year and the secretary was instructed to cast a ballot for their election. The officers for the forthcoming term are, therefore:

President, S. L. Willson, American Writing Paper Company, Holyoke, Mass.

Vice-Presidents, Felix Pagenstecher, Bryant Paper Company, Kalamazoo, Mich.; M. E. Marcuse, Bedford Paper Company, Richmond, Va.

Executive Secretary, O. M. Porter, 18 East 41st street, New York City.

Executive Committee: S. L. Willson; Felix Pagenstecher; M. E. Marcuse; Hugh Chisholm, Oxford Paper Company, New York City; A. R. Graustein, International Paper Company, New York City; D. C. Everest, Marathon Paper Mills Company, Rothschild, Wis.; C. B. Morgan, S. D. Warren Company, Boston, Mass.; Norman W. Wilson, Hammermill Paper Company, Erie, Penn.; George W. Gair, Robert Gair Company, New York City.

PRESIDENT'S ADDRESS

D. C. Everest, the retiring president of the association delivered his address as follows:

I am pleased to note the increasing interest in association work as evidenced by the attendance this morning and also at the group meetings during the week. Last year we discussed the advisability of holding this meeting earlier in the week, but after careful consideration it was decided to hold it on Thursday, thus giving opportunity for the discussion of subjects which might be brought out in any of the affiliated organization meetings during the week.

As we have now returned to our original plan of holding the business meeting on Thursday there will probably be no further attempt to change the time unless some emergency arises which necessitates getting some important matter before the membership early in the week, thus allowing for discussion in group meetings. During the past year the service of the association has been improved and extended. We have endeavored to confine our efforts to those things for which there has been a demand. We have eliminated some activities and added others.

At this time I wish to acknowledge with sincere thanks the able support of the executive committee and of special committees and of the other officers and staff of the association. They have all worked diligently for the welfare of the association. I think few people realize how much work there is in connection with association affairs. It is not always the good things that happen which indicate the activity of an association, but rather the detrimental things that don't happen and which few people ever hear about, which constitute the accomplishments. After two years' intimate connection with it I am convinced that the association is absolutely necessary to the well being of the industry.

After observation of other associations, I am also convinced that this association is equal to any and that all have the same problems, some functioning better than others, but all facing the difficult question of how to assist in correcting the troubles in industry, which have been created over a perior of years and for which no particular person or group of persons is to blame.

We are suffering, as is every other industry, from the accumulative effect of changes and mistakes of an industrial development which had no precedents.

I do not intend to dwell at length on the work of the past year. The Secretary, Major O. M. Porter, has prepared a report which has been printed and distributed at this meeting and will be sent to the entire membership. This sets forth very clearly the accomplishments of the past year. Major Porter has been untiring in his efforts in behalf of the Association and I wish to take this opportunity to commend him to the membership.

The further development of the statistical service under direction of Mr. Kavanagh and the publication of the *Weekly Bulletin* have been very favorably received by the membership.

Mr. Boyce's work in the Woodlands Section has brought about renewed interest in this very vital subject.

Waste Utilization and Stream Purification

Mr. Baker's work in the matter of waste utilization and stream purification has been productive of excellent results. I have found that there is a lack of support of this work and that few people give credit to the Association for arousing interest in this subject and particularly in Waste saving and utilization. I know that many mills have received suggestions which have enabled them to make great savings but some of them do not feel disposed to pay anything toward extending the work. I sincerely hope this work may be put on a more cooperative basis and that more mills will support the work and make use of the information which has been developed.

Cost Association

I wish to comment on the work of the Cost Association. Mr. Burke has done excellent work for those interested in uniform cost systems, and in grade costs. More mills should avail themselves of this service. Any mill which is still figuring average costs for all grades and weights is making profit-making difficult for themselves and extremely hard for their competitors. If you are not figuring grade costs it will pay you to join the Cost Association.

Technical Association

The Technical Association has shown the greatest year in its history. The fall meeting at Wausau, Wisconsin, was one of the best meetings ever held. I had the pleasure of attending some of these meetings and if there are members whose Technical staff are not members of that Association, I urge you to have them join. I think it is the best association of its kind in any industry.

Superintendents Association

The Superintendents' Association has been very active in its divisional meetings and in its general work. The meeting which is being planned for Wausau, Wisconsin in June will probably exceed, in attendance, any previous meetings. Have your Superintendents and Assistants attend that meeting. It will be very much worth while.

Salesmen's Association

The Salesmen's Association has contributed much to the stabilization of business during the last year. The interchange of information respecting market conditions has been helpful in allaying rumors and detrimental influences in the distributing end of the business. The promotion of acquaintanceship—if nothing more was accomplished—would more than justify the continued support of the Salesmen's Association.

All of these associations have been of great service to the industry. I wish also to express my appreciation of the support given the Association by the trade press. It has been invaluable in getting our ideas before tthe members.

Two Important Matters

During the past year we have had two very important questions to deal with. One was the matter of Tariff, the other, the question of change in the form of organization of the association. Both

of these matters were handled by Committee. In the matter of tariff hearings we have demonstrated the value of the Import Committee of the Paper Industry. After four years of work, during which time it has handled nearly four thousand cases, the Import Committee has developed a world of information relative to the ways in which the present tariff law is being evaded in relation to paper and paper products. It was this information and the help of the Import Committee, together with the committees from various groups in the industry and our able attorneys Wise, Whitney and Parker, which enabled us to present what was said to be the best brief presented in behalf of any industry during the six weeks of hearings before the Ways and Means Committee.

The Tariff

There were numerous conferences respecting tariff matters in which both members and non-members joined.

In dealing with this subject, we found that the present tariff law covered 74 major items made up of innumerable grades. With respect to 53 of these items, no change in rate was asked. We asked for changes in rates in 21 items where conditions in the industry have indicated that the existing rates are no longer adequate. These instances are due almost entirely to the development of new types of paper, many of which were unknown in 1922, the time of the last revision of the tariff. Due to the work of the Import Committee, Major Bullock was able to suggest to our Tariff Committee many places in the existing law which needed clarification. In submitting our brief we suggested to the Ways and Means Committee, a better wording of various sections of the law, which would clarify the situation. If these suggestions meet with approval, I am sure that it will improve the situation for the industry.

The fact that we were not asking for a duty on newsprint paper brought about a line of questioning as to why we had not requested protection. Our answer to this question was that we did not believe that it would be advisable to ask for a duty on newsprint as the removal of duty under the so-called reciprocity act twenty years ago had brought about a change in the entire industry. The major portion of newsprint tonnage has been transferred to Canada and it would be foolish for any one to suppose that any rate of protection, which is subject to revision or removal by Congress, would re-establish the business in this country. With the wonderful development of the newsprint industry in Canada, with all its natural economic advantages for the production of that grade, and the fact that the actual consumers are the owners or part owners of several of these properties, it would be preposterous for anyone to think that the United States might again re-establish the newsprint industry and provide its own requirements. There was no fear of the newspapers, or what they might have to say regarding our position on tariff matters. We recognize when we are up against a stone wall. We realize that we were caught in a jam in the so-called Reciprocity treaty and that this industry has suffered from the readjustment due to the removal of the tariff on newsprint and the gradual transfer of the business to Canada.

O. M. PORTER, SECRETARY

The Reciprocity Fiasco of 1911

The removal of duty on newsprint was responsible for most of the troubles of our industry today. Following the reciprocity treaty there was a great readjustment of grades. Old mills making newsprint went on to wrapping, book, writing and other papers. During the war, due to the excessive demand, there was a breathing spell and this excess production was not badly felt, but with the cessation of the war it was found that these grades were over produced. It has been a constant shifting of grades ever since the war. One after another, news print mills have gone on to other grades and there are yet more to follow. We are not through with this mess. It will take another five years to complete the revamping of the industry. This means that after twenty-five years we will be still wrestling with the problem of readjustment of the industry due to the removal of duty on one of our largest tonnage grades. That is water over the dam, with some reserve yet to go, but it clearly demonstrates the necessity of adequate protection on the balance of grades made in this country. The work of the Tariff Committee has only just begun. I sincerely urge that you give this committee every possible support, both moral and financial, whenever you are called upon, as without adequate tariff protection we will not be able to maintain the industry, together with the half million or more persons who are dependent upon it.

Committee on Development

The second thing which has occupied our attention has been the work of the Committee on Development. You will recall that the appointment of such a committee was authorized last year. The Committee was charged with the duty of recommending to this meeting a form of organization which would meet the needs of the present day development of the industry. This was no small job. Numerous conferences were held and a report has been prepared which will be presented later. I believe the committee has done an excellent piece of work. I believe that their suggestions are excellent, but I also believe we should make haste slowly. I would urge that this matter be referred to the incoming administration with power to act. I believe such an organization will be built around some outstanding man. It may be possible to find that man within a short time or it may take six months, but in the meantime I want to remind the membership that they have a darned good association "as is" and I urge your continued and more liberal support of what you have. The reason we can't do more for you is because we don't have financial support sufficient to do what the executive committee and the employed staff feel we ought to do. We are in the same position as a manufacturing business, we have a certain over-

head budget which has reached an irreducible minimum, now if you are only willing to furnish money to cover overhead then we "are all dressed up and nowhere to go" but, if you provide funds beyond actual overhead, then we can commence to show results, and beyond certain fixed costs, any money contributed will yield substantial benefits.

Need for Complete Organization

This industry needs an association. It needs the complete organization of the industry in group associations. There is no longer need for sectional organizations. We are in one market and what affects one part of the country reacts on the others. Unorganized groups are not only a bad thing for members of that group, but are a menace to the entire industry. I believe it will be admitted that the better the organization of each group, the better the business in that group. Selfishness is the controlling factor in this business and until some people learn that the rights of others are to be considered and that no business can long exist which thrives on unfair practices in relation to its competitors, we will undoubtedly have a bad condition in the industry. Fear that they may not have continuity of operation, has caused most of the mills to take on desirable orders as "back log tonnage" at low prices. This practice has continued until I believe more than fifty percent of the tonnage is "back log" and such business which would otherwise be very desirable is without profit, leaving only the smaller tonnage orders on which one may hope to make a profit.

We have increased capacity to a point where we have a five day volume which has been sold on a seven day operating basis. Old "General Overhead," the bugaboo of industry has us on the run.

We need every branch of this industry organized. This is essential if we are ever to get anywhere and particularly those branches which represent large tonnage and in which there is such terrific competition. We need to operate this business on reliable statistics and not on hopes. As I endeavored to point out last year; we need more complete organization of the industry and more knowledge of what is going on in the industry.

Over Expansion

We need a breathing spell in building and expansion programs. We have a billion dollars in this business, operating at 80 per cent of capacity and there is no need of further expansion. If there were no additions in equipment during the next six years, the normal increase in consumption would have only then caught up with capacity. We have the most necessary product of commerce and yet, through our own mishandling, we are not receiving the benefits we should from our efforts.

I believe that 1929 will show an increase in consumption over the previous year. This was true in 1928, but the paper industry did not receive its share of the reward which should have followed such an increase. I believe our situation is critical and we need Association effort. I strongly urge that you support the new administration in their efforts to organize the industry. Help them morally and financially. I trust the new administration will receive your hearty support in every way. Don't let us slacken our efforts in any way in anticipation of a new form of association.

Federal Trade Commission

In conclusion, I wish to bring to the attention of the members the matter of Federal Trade Practice Submittals. In my opinion, the present program of the Federal Trade Commission is helpful to industry. The elimination of trade abuses and of unfair practices cannot help but bring about a better situation. The establishment of standard trade practices in any branch of the industry is bound to correct many of the abuses and eliminate possibilities of unfair competition. Two branches of the industry have this matter under consideration at the present time. I believe it will pay organized groups to investigate this matter and that unorganized groups should organize and confer with the Federal Trade Commission relative to the problems of their branch of the industry, with a view to adopting standard Trade Practices. Judge Humphrey of the Federal Trade Commission, will speak to us this afternoon on this subject and I urge all of you to hear him and to bring your friends who migh be interested in this subject.

Improvement in 1929

From developments which have taken place here this week, including the perfecting of the organization of both the sulphite and sulphate wrapping and bag paper groups, and other progressive work which has been done, I feel that there will be an improvement in 1929 business. I firmly believe that if people exercise ordinary common sense in the handling of these problems we may look for a stabilization of the market in several of the highly competitive grades. This all depends on the gentlemen in the industry. If we will have faith in one another and forget past history and decide to meet the situation on the basis of what we are to do from "now on," there is no reason on earth why we should not have a good business year.

The trouble with this industry is the fact that we have too much tradition and past history, too many people who remember some grievance of long age and who delight to recount all the troubles of the past and refuse to recognize the necessity of doing something constructive for the future.

Let's forget past history and see if we can't build up an acquaintanceship and a faith in each other which will permit of our doing a profitable business in one of the most prosperous eras in the history of this country.

SECRETARY'S REPORT

Oliver M. Porter, secretary-treasurer, presented his annual report as follows:

1. The Paper Industry in 1928

Before describing the activities of the Association during the past year it might be well to comment briefly on the condition of the paper industry in 1928 and its prospects for 1929.

The industry probably produced more paper in 1928 than in any previous year; and yet it was not a profitable year for the industry, generally speaking. Nearly a quarter of the industry's machine capacity was idle. Despite this fact, however, new production facilities were added very much more rapidly than increased consumption warranted. This condition naturally led to intense competition, with the result that the profits of the industry were seriously affected.

Still further increased production facilities and keener competition may be expected in 1929, and there is little evidence of any improvement in the profits situation in the months immediately ahead because of the large percentage of present idle capacity and that which will be installed, particularly in the South and West.

Now, more than ever before, the industry needs fearless and intelligent leadership. The attitude of the government is such as to encourage intelligent rationalization of industry and the paper industry of the United States must take advantage of this opportunity, as will be referred to hereafter in this report, if it is to meet the competition of other industries and operate at a profit. I might suggest as the industry's 1929 motto, "Not less production but greater demand—at a profit"; or, more briefly—"Quote for a profit!" Profitable production is probably the greatest single problem of the industry today, and its solution, or legalized price control, depends on the willingness of the leaders in each branch of the industry to cooperate for their mutual profit and the prosperity of the industry as a whole!

2. Value of the Association to the Industry

There is no question as to the value of the American Paper and Pulp Association to the paper and pulp industry of the United States. The Association enables the industry to act as a unit for its own protection, promotion and perpetuation with respect to the major problems of general import to all branches of the industry.

With fundamental problems common to so many mills in each of the various grades in the industry, it is absolutely essential

that there be a well-organized, adequately financed and ably led Association to speak for the industry as a whole and to work continuously for its advancement by putting the industry squarely back of broad comprehensive movements on which its progress must be based. The industry is fortunate in having in the American Paper and Pulp Association just such an organization, which is recognized both here and abroad as representing the paper manufacturers and converters in all their major common problems.

The paper industry stands seventh among the great industries of the nation. It is a fundamental basic industry, with an annual production in excess of 10,000,000 tons, valued roughly at $1,500,000,000. One cannot picture our modern civilization and commercial progress without the products of this tremendous industry. To meet these needs it must progress, it must operate at a profit and it must be a permanent industry. These objectives are those for which the American Paper and Pulp Association is working, and it is for these reasons that the Association merits the industry's substantial financial support and the ready cooperation of its executive leadership.

3. Fundamentals

It might not be out of place here to record some of the fundamentals which may govern the character and extent of the Association's service to the industry and its relations with other organizations in the industry:

(a) The American Paper and Pulp Association is a federated organization, representing the entire paper industry in all matters of general interest and fundamental importance.

(b) The Association's function is to handle the industry's major common problems and to coordinate, as far as possible, those services or activities which affect all mills in every branch of the industry.

(c) It is logical and necessary that groups of manufacturers making similar products, and thus having similar problems, should form associations to take care of those problems, but these associations should be affiliated with the American Paper and Pulp Association in order that it may effectively represent the interests of the entire industry. This affiliation should be on the basis of a nominal affiliation fee unless it is consummated on the basis of special statistical or other services to the affiliated association, in which case the affiliation fee should be commensurate with the extent, character and cost of this special service.

(d) The Association will make a continuous effort to form constituent groups and to bring them into affiliation with it. The Secretary of the American Paper and Pulp Association or other members of its staff may have occasion to act temporarily as secretary of the groups being formed into associations during their development stage.

(e) Membership in the American Paper and Pulp Association should be confined to manufacturers and converters of paper and pulp or the products thereof, except as divisions may be formed to bring such groups as the Supply and Equipment manufacturers or associations of other allied lines into the industry's organization structure.

(f) The Association should be financed directly by its individual mills on a uniform basis of gross sales. Its financing should be so arranged that special requests for funds will be eliminated in so far as possible.

(g) It would probably promote the effectiveness of organized effort in the industry if all the organizations established for the purpose of rendering service to the entire industry, regardless of grades or product, were to be under the direction of the American Paper and Pulp Association, thus effecting more complete coordination of the cooperative efforts of the industry.

4. Policy

Having been the Assistant Secretary of the Association for eight years it was relatively easy to assume the responsibilities of management without the necessity for any fundamental change in policy.

Our policy has been to focus the Association's efforts on those fields which lie clearly within its province and in which there was evident opportunity for useful service to the entire paper and pulp industry of the United States. Emphasis, therefore, has been placed on the Association's tariff and legislative work, its statistical, woodlands and waste utilization service, and on its direct service to its member mills.

One other policy has governed our activities this fiscal year—namely, *to keep the Association's expenditures well within not only the budget adopted at the last annual meeting, but also within the Association's income.* This has been done and our surplus has been increased somewhat, so that there is now every prospect of completing the Association's current fiscal year with an income in excess of our expenditures and a nominal reserve on which we can draw in case of emergency.

Your Secretary wishes to acknowledge the substantial financial support received during the past months from the Association's Supply and Equipment Section. This Section is composed of some sixty manufacturers of machinery, equipment and supplies used in the industry. The Section resulted from the affiliation of the former Supply and Equipment Association, which was organized for the specific purpose of assisting the American Paper and Pulp Association in its service to the paper industry of the United States, on the theory that whatever success the Association had in promoting the welfare of the paper industry would be reflected advantageously on the manufacturers of supplies and equipment sold to the industry.

A pamphlet, listing the members of the Association's Supply and Equipment Section and their products as available to the paper industry, has been prepared for distribution during this convention and it is recommended that members of the American Paper and Pulp Association avail themselves of these useful data.

5. Program

Inasmuch as the Secretary's annual report *is* an historical record of the Association's activities and accomplishments, I should like to record here the actual program on which we have focused our efforts during the past months, as follows:

(a) Organizing the paper industry for tariff protection.

(b) Furthering the industry's legislative interest.

(c) Promoting waste utilization and stream improvement.

(d) Developing a dependable and comprehensive statistical service.

(e) Continuing effort to perpetuate the industry's wood supply.

(f) Providing effective, direct service to member mills.

6. Things Done

After this review of the Association's program it seems advisable to indicate what its definite accomplishments have been since the last annual meeting. Described very briefly, these are as follows:

Tariff

Through the Association's General Tariff Committee and in the closest possible cooperation with the Import Committee of the American Paper Industry, the industry has been thoroughly organized for tariff action in the interests of the industry as a whole. Changes clarifying the phraseology in the administrative sections of the tariff law and briefs as prepared by the several associations in the industry were presented through the Association's Tariff Committee Brief, to the Ways and Means Committee of the House at hearings on February 13 and 14, 1929, and will be presented to the Senate Finance Committee, in an effort to insure adequate protection for the industry in the pending tariff revision.

Your Secretary wishes to express his appreciation of the great assistance and unusually effective cooperation of the Import Committee through its Manager, Warren B. Bullock, and its Counsel, Messrs. Whitney and Parker, in the Association's tariff activities during the past four months. Our industry is indeed fortunate in having both a strong, well-recognized national association to present its united front in matters of common interest to the indus-

try, and an effective Committee to enforce the provisions of the tariff law and thus insure the industry that measure of protection to which it is entitled under existing laws. The Import Committee is doing splendid work for the paper industry in preventing the importation of misclassified and under-valued papers. While the Association's efforts to secure adequate protection for the industry in the rates and wording of the various tariff schedules occur but once in 4 to 8 years, when any tariff law is undergoing revision, yet the work of the Import Committee to secure the enforcement of the legislation thus secured by the Association is continuous day in and day out, year after year. It merits the whole-hearted and adequate financial support of the entire paper industry.

Statistics

The Association's statistical service has been materially strengthened and expanded. Its Monthly Statistical Summary, as now furnished reporting mills, is in comprehensive, printed form, and its facilities for developing special statistical reports are being used by an increasing number of groups in the industry. Mr. J. A. C. Kavanagh, the Association's statistician, deserves special commendation for the way in which he has carried forward the work of the Statistical Department.

Waste Utilization

Through Mr. C. M. Baker, the Association's engineer, the industry has been very well organized for work on waste utilization and stream improvement. Mr. Baker is preparing a series of pamphlets describing the exact methods by which waste utilization may be obtained in the various branches of the industry and the legislative problems involved, etc. His work demonstrates very clearly the value of cooperative effort along these lines and indicates the possibility of very profitable savings to the paper industry through waste utilization and stream improvement. It seems unfortunate that there has not been more general appreciation and hence more adequate financial support of his work by the industry at large.

Woodlands Section Service

The Association's Woodlands Section has been reorganized by its forester, Mr. Charles W. Boyce, and a definite program has been undertaken to determine the economic practicability of forestry as a means of supplying permanently the pulpwood requirements of the industry. Although of an extensive nature, this study promises to develop much information which will be of immediate value in the formulation of forest management policies. In this connection a survey of the progress of forestry in the paper industry has recently been completed, which reveals the extent to which the industry is providing for its pulpwood supplies.

Foreign Contacts

As a result of efforts by the Association's former President and Secretary, Mr. Norman W. Wilson and Dr. Hugh P. Baker, followed by the activities of the present officers of the Association, Mr. M. H. Lund has been appointed by the Department of Commerce as Commercial Attache at Oslo, with the understanding that a large proportion of his time will be devoted to the interests of the paper industry, thus giving the industry in effect a paper trade commissioner in Europe.

Weekly Business Review

The Association has continued its Weekly Business Review, the character of which has been changed somewhat so as to deal more intimately with conditions in the pulp and paper industry, thereby making it of more value to the executives in the industry. Its lead articles take the place of frequent letters and yet enable your Secretary to bring to the attention of the executives of the industry matters which he feels should have their timely consideration.

By-Laws and Basis of Dues

At this meeting action will be taken on revision of the Association's by-laws as well as on a proposed method of financing the Association through annual dues on the basis of gross sales, which, if accepted, will give the Association a modern practical working basis which will be both equitable and adequate.

New Affiliations

The structural organization of the Association has been strengthened during the year by the amalgamation of the Supply and Equipment Association as a Section of the Association and by the affiliation of the Wallpaper Manufacturers Association, thus enabling us to extend our service to those branches of the industry.

New Associations

During the past few months persistent effort has been made, under the sponsorship of the Association's officers, to bring about a reorganization in the wrapping paper industry. This has been accomplished and the two new wrapping associations—the National Kraft Paper Manufacturers Association and the National Sulphite Paper Manufacturers Association—are now functioning, with their statistics handled by this Association.

Progress has also been made during this period towards a reorganization of the glassine and book paper industries. There is also every prospect for the development of an organization of paper twine spinners—all of which indicates that the Association is meeting its obligations to further develop the structural organization of the industry.

7. Committees

As reports on the activities of the Association's various standing and special committees will be presented at this annual meeting, I will simply refer briefly to the service which the men on these committees have rendered to the paper industry. Unfortunately there is an incommensurate appreciation of the work which the Association's officers and committee members do for the industry. An association must work through its members and will be successful only to the extent to which its members are interested and participate in its work. Too much of the industry's association burden falls on the shoulders of those executives who are willing to assume those burdens for the advancement and welfare of the entire industry.

8. Recommendations

After almost nine years with the Association your Secretary feels that he may be sufficiently familiar with the fundamental problems of the industry to justify the following recommendations:

(a) That the industry effect a unification of financial control of its cooperative activities thus reducing the number of special appeals for funds and assuring their allocation in accord with the importance of the various problems involved.

(b) That the Association develop an effective Publicity Service, under the direction of an experienced newspaper man, of:

(1) Giving the industry the right kind of publicity.
(2) Keeping the members fully informed of its activities.
(3) Maintaining close contact with government Bureaus and Departments.

(c) That a market survey of the country's present and potential demand for paper be undertaken in cooperation with the Bureau of Domestic Commerce of the United States Department of Commerce, and the National Paper Trade Association, so as to give a factual basis for the industry's future production schedules.

(d) That the Association appoint a Committee to work with federal authorities in effort to devise a means for eliminating uneconomic, unprofitable and unfair selling policies and practices.

(e) That the financing of the Association's work in waste utilization and stream improvement be through the budget of the American Paper and Pulp Association, as presented for adoption at this meeting, and that the Cost Association be affiliated or absorbed as a Section of the Association, in order thus to enable the Association to give more effective cost and financial service to the industry as a whole.

(f) That as rapidly as the Association's development and financial ability may warrant, it handle the following activities in the interests of the industry's protection, promotion and perpetuation:

(1) The development of profitable merchandising and distribution policies for the industry.
(2) Trade extension, both domestic and foreign.
(3) The development of new uses.
(4) National advertising.

(5) Economic studies covering perpetuation of the industry's raw material supplies.

(6) Further development of centralized research and technical control.

9. Tribute

Now, at the end of my first year as Secretary and Treasurer of the American Paper and Pulp Association, I wish to express my gratitude to President Everest, to the members of the Association's Executive Committee, to many executives in the industry, to the secretaries of the Association's affiliated organizations, to the members of the Association's staff, and also to the representatives of the trade press, for the help which has been given me in carrying on the Association's work during the months since its last annual meeting. The industry owes much to these men who have given so freely of their time and energy to guide and promote the work of the Association.

10. Conclusion

I am looking forward with pleasure to the opportunity and responsibilities of more effective service to the industry during the coming year through the Association's increased facilities for such service.

ENGINEER'S REPORT

C. M. Baker, the engineer of the American Paper and Pulp Association, reviewed the progress made in waste utilization and stream improvement in 1928. He reported, in part, as follows:

"Substantial progress has been made in the association's waste utilization and stream improvement activities although there has been only one year of active, progressive work.

"Briefly stated the activities of the engineer include:

"1. Representation of the industry before state and federal officials and other organizations interested in stream improvement to develop definite, cooperative programs or policies, and thus check the tendency toward radical legislation.

"2. The fostering and coordination of research within the industry.

"3. The collection, assemblage, and dissemination of data.

"In carrying out this program it has appeared necessary to organize committees representative of:

"1. The paper industry in the various states where it is confronted with the problem of stream pollution, in order to cooperate with state and local officials, and form a connecting link between state activities and the national program of the Association.

"2. Various classifications of the industry such as strawboard, paperboard, and sulphite.

State Activities

"Consistent with the policy of confining our activities to those states or localities where active programs in stream improvement have already been initiated by local officials or other organizations, definite contacts with state officials have been made only in the states of Connecticut, Indiana, Maryland, Michigan, Minnesota, New York, Ohio, Pennsylvania, Virginia, West Virginia, and Wisconsin. In all of these except West Virginia state committees representative of the paper industry have been organized. The organization of these committees, together with the development of constructive, cooperative programs between them and state officials has constituted the principal work during the past year. It has been assumed that the development of such cooperative activities will head off radical legislation and policies. Also that it is better to get in touch with the situation early, and thus develop or formulate the original program than to wait until legislation or policies have been developed and then try to change them if unsatisfactory.

"In many instances joint meetings of industry, state officials, representatives of sportsmen's organizations and others interested in the problem have been arranged, and attended by the writer. At all these meetings harmonious, cooperative programs have been developed, and, although state officials have indicated a desire that definite progress be made, they have been considerate of the interests of industry. Sportsmen's organizations have also been reasonable in their attitude.

"Although as stated above, definite activities have been carried on only in those states mentioned, studies have been made of the situation in other sections of the country, and considerable data secured.

Legislation

"Throughout the activities of the past year the question of legislation has been outstanding. The tendency in the past has been to enact prohibitory rather than regulatory laws, which are impossible of enforcement without closing industry. Constructive legislation provides for placing authority in one committee or board, and the building up of an organization for a careful scientific study of the problem. Typical of this type of legislation are the laws now in force in Pennsylvania and Wisconsin. The main provisions of such a law include:

"1. The establishment of an advisory committee or board representative of the various interests, to have complete jurisdiction over all matters relating to stream pollution.

"2. The designation of an executive, preferably a representative of the State Department of Health.

"3. Powers and duties such as

(a) General administration and enforcement of *all* laws relating to pollution.

(b) The initiation and conduct of research to discover economical and practical methods for a solution of the various problems, either alone or in cooperation with industry and other organizations.

(c) Issuing general rules and regulations and special orders affecting specific localities.

(d) Entering into agreements with other states and federal authorities in the conduct of scientific research and control of conditions on interstate streams.

"4. Provision that the owner of any plant or establishment shall cooperate by furnishing essential data.

"5. Equity in the adjustment of orders or findings of the administrative board by hearing and reconsideration by the Board itself, court review and decision, or arbitration.

"6. Penalty for non-compliance with orders of the Board.

"7. Ample appropriation for execution of the work.

"The Wisconsin legislation has been satisfactorily in force for over a year. It was endorsed at the state convention of the Izaak Walton League, and has been approved by representatives of National Headquarters of this organization. Furthermore, industrial representatives have endorsed it as fair to industry.

"Where the question of legislation is involved, the Association's Engineer will be glad to cooperate by supplying further details.

Research Committee

"Paperboard:—A. B. Thomas, general manager, North Star Strawboard Mills, Quincy, Ill., chairman.—This committee was organized through the Paperboard Industries Association at the suggestion of the engineer of the A. P. P. A. Although no general report is available, much progress has been made by individual mills. One reduced its water consumption from approximately 28,000 gallons to 3,000 gallons per ton of product, by merely recirculation of the white water on the showers. Another mill is operating on substantially if not completely a closed system.

"Strawboard:—A. B. Thomas, general manager, North Star Strawboard Mills, Quincy, Ill., chairman.—The work of this committee was organized and commenced before the activities of the Association. Valuable research has been carried on at the Hagar Strawboard Mill, Cedarville, Ohio, and the Hinde & Dauch Paper Company at Delphos, Ohio. The early research indicated that by adding a coagulent and slightly modifying the cooking and beating processes straw board mills could operate on substantially a closed system. Later development, however, disclosed the fact that it is impossible to manufacture as high a grade of paper by this process, but the research is still in progress, and it is believed that definite results of value will yet be secured. A more recent development, now being worked out at Cedarville, consists of sedimentation

and return of the effluent water to the system with separate disposal of the sludge without utilization in the product.

"SULPHITE:—George K. Spence, Castanea Paper Company, Johnsonburg, Pa., chairman.—The committee is compiling data regarding both successful and unsuccessful installations for utilization of sulphite waste liquor. Studies are also being made of the present status of the market, and possible future needs should the coal briquetting industry expand. In other words, all phases of the problem are being studied by the committee before initiating definite research activities.

"Research by the E. B. Badger & Sons Company, in cooperation with the Oxford Paper Company at Rumford, Maine, indicated the possibility of profitably evaporating and burning sulphite waste liquor under certain conditions. At the Marathon Paper Mills, Rothschild, Wisconsin, the Howard process of differential precipitation is being developed. This consists first of precipitation of the sulphurous compounds for re-utilization in the industry, then further precipitation of the resins and lignins for burning. Laboratory experiments were first carried out and a pilot plant is now in operation.

MILL SURVEYS

Upon request of the mill executives the writer has visited a number of mills to cooperate in a study of their problems. While it has been impossible for him to spend sufficient time to make a detailed study of the situation, careful consideration has been given to the problem in each case, and a detailed report submitted, outlining further studies that should be undertaken in the development of improvements in waste utilization and stream conditions.

"This is a service which the Association will be glad to extend, as so far as its personnel will permit, during the coming year. Obviously, though, it will be impossible for the one man available to cover this field extensively.

DATA AVAILABLE

"As previously pointed out, the major activity during the past year has been the development of cooperative programs between the industry and state officials. There has been accumulated and is available, however, considerable useful data and information, but it has been considered desirable to wait until rather definite results are secured before publication, in order to eliminate the danger of disseminating premature or unreliable information. During the next year, however, this material will be rounded into shape and published. In the meantime, mills confronted with specific problems may secure such pertinent data as are available by communicating directly with the Association's Engineer, C. M. Baker, 2 South Carroll street, Madison, Wis."

REORGANIZATION PROGRAM

The report of the development committee was presented by the chairman, Colonel B. A. Franklin, of the Strathmore Paper Company, as follows:

It is a fair statement to make that the manufacturer of no other product in the great American Industry has reason to be more proud of his position than the manufacturer of paper.

The paper business is a clean and inspiring business.

Supplying a vast and growing demand, making a varied and increasingly artistic production, with a quality in various lines not surpassed anywhere in the world, with an increasing demand from all parts of the world susceptible of further expansion, reaching out into every other field of production, of cleanliness, of education, of protection, of statistics and records, of utility, of sound, of sight, of transmission, of advertising, of literature, of practically every human use, the manufacturer of paper may well feel that he occupies a fundamental position of great and irreplaceable value to the public.

His production once used can only be replaced by new production.

He occupies almost an unique place in civilization necessity.

His product combined today reaches over 10,000,000 tons with a value of over $1,000,000,000.

The paper manufacturer has gathered around him a group of highly trained workers, well paid, apparently satisfied.

He has, in general, built a stable business well equipped, and with reasonable progress in the latest improvements.

He is, in very many cases, developing research and management methods up to date.

He is essentially a great and growing fixture in the scheme of America's great development of Industry and Commerce.

He, nevertheless, has to meet two difficulties—over-production and competition.

Organization Necessary

The question arises then, how shall this manufacturer, for the public, for his workers, for his organization, and for his stockholders, so organize his interests as to be of, and to obtain, the greatest values.

His difficulty lies in the fact that as a single manufacturer, he is without the fundamental facts of the business as a whole, its progress, the comparative relation of demand and supply of the whole, and of his particular grades, volume of orders, of production, of shipments, of the state of the market, and of different developments, except as he can glean these generally from his intimacy with the market, much of which information is gossip and conjecture. He is subject to the ills and fears of competition without obtaining the best values of competition.

As a single manufacturer he is powerless in certain governmental and indirect movements affecting him greatly, which need a combination action to observe, to comprehend, and to influence.

As a single manufacturer he becomes a decentralized unit of a progressing industry, advancing possibly to his own satisfaction, here and there, but certainly without the complete knowledge, aid, and assistance of group organization, which have always proven valuable and profit making.

The history of the progress of particular groups of industry in America in the last quarter of a century particularly, has shown that cooperative competition and not cut-throat and ignorant competition is the basis of the best industrial success.

This has been afforded tremendously by trade associations.

Now, of course, the paper industry has had, and still has, trade associations.

There are many grade groups, such as the Writing and some other groups that have remained splendidly, intelligently, and profitably organized. In fact, the Writing Paper Association, founded in 1861, is the oldest trade association in America, a sufficient warrant for the best organization in the paper industry.

The paper group as a whole has, in the American Paper and Pulp Association, an organization fifty years old, during which time the volume and value of paper manufactured has increased over twenty-fold.

But note that the development of trade associations in the paper industry has not been of a unified and logically progressive type.

The actual present condition of the organization of the paper and pulp manufacturers, is that it consists of a number of independent units with varying membership in the different units, some of whom are not connected with the American Paper and Pulp Association.

We have thus a number of associations of like grades of manufacture, as indicated in the chart attached.

Yet there are a number of very important grade groups not organized at all, not a little because no central authority is distinctly responsible to see that they are organized, kept organized and so operated as to be of real benefit to the individual members. Where this has been properly accomplished there is not the slightest question but what the value to the individual manufacturer is vastly in excess of any cost entailed.

It is a fact of experience also, that every unorganized group creates an injury to the organized groups.

In addition to this, there are a number of movements of general value to all paper manufacturers which are separately organized,

finding independent and varied support. Such groups are the Cost Association, the Technical Association, etc., etc.

It will be seen then, that the paper industry in its organization, is becoming a large group of independent and separately financed groups with varying membership.

Essentials

It would seem, therefore, in these days of combination, concentration, and of close organization, that some central or general organization ought to be built up, strengthened, financed, and charged with the responsibility to put forward, to energize, and to guide those movements which are for the particular and general good of the paper industry.

It seems merely a matter of common sense, that some general organization should be constantly charged with the responsibility of endeavoring to organize all grade groups, to assist such groups to get started properly, to possess standard and successful methods, and to keep organized.

Here is a first essential need, because it would bring an essential good to all unorganized groups. Despite efforts in this direction, lack of a sufficiently strong central association in organization and finances has not permitted this accomplishment.

It would also seem more economical and effective, if movements for the general good were operated through the general association.

Circular Relationship

It seems entirely logical, and actual experience has made it very clear, that grade groups must operate largely as independent associations, because their particular interests, while in general related to the whole paper industry, have a particular relation only to the individual members and can only be decided by them.

It appears then that the best relation of these grade groups to the general association, is one of federation, as far as their particular grade interests are concerned, and this relation may be considered a circular relation. (See chart).

The responsibility of the general association is mainly to see that as far as possible, a constant effort is maintained to keep them organized, to see that they are offered the services of competent secretaries, and are informed of standard and successful methods of profitable grade group operation.

But this is a very great value.

In this sense a committee of affiliated association secretaries and the general secretaries could lend much to the whole scheme.

Horizontal Relationship

In the case of the present independent and variously membered service groups undertaking to accomplish certain functions which ought to be of value to all paper manufacturers, such as the Cost Association, an Import Committee, the Technical Association, the Mill Superintendent's Association, the Salesmen's Association, etc., their functions, by their very nature, even with different executive committees and secretaries or managers, can be, and ought to be, of general benefit. They demand proper general support, and ought, for their own greatest efficiency, economy and continuation of life and usefulness, to be attached to the general association.

Unquestionably there would be economy in such operation. Unquestionably there would be greater effectiveness, support, and longer and more effective life in unity, than in the present independent and heterogeneous plan. Unity is natural to most effective usefulness.

These we might consider of a horizontal relation to the general association. Each would have its own executive committee, officers, and secretary or manager.

Vertical Relationship

There still remain certain functions which should be of value to all grade groups, which can best be operated through the general organization, such as legislation, tariff consideration, general sta- association. Each would have its own executive committee, officers, and secretary or manager.

Recapitulation of Relationships

It will be seen then from the chart that the grade groups, with their own problems perculiar to themselves, operate and are financed independently, but are federated to form the general group, the American Paper and Pulp Association, whose responsibility to them is to make constant efforts to keep them organized, a need vastly apparent in the paper industry. Here is the circular relationship.

Those efforts, which are of general and even specific value to all the groups, even with separate committees and secretaries, operate horizontally under the general group and with sufficient independence, but guided and financed from the General Association. This is the horizontal relationship.

Finally, there remains activities which can properly function and emanate from the general association itself, such as tariff, legislation, statistics, general information, forestry, etc. (See Chart). This is the vertical relationship.

Basic Principles

Perhaps these may be all stated as a set of basic principles, as follows:

1. The American Paper and Pulp Association is a federated organization, representing the paper industry in all matters of general interest.

2. The function of the American Paper and Pulp Association is to handle the industry's major common problems and to coordinate and direct those services or activities which affect all mills in every branch of the industry.

3. All associations established for the purpose of rendering service to the entire industry, regardless of grades or product, should come under the direction of the American Paper and Pulp Association.

4. Groups of manufacturers making similar products and thus having similar problems, should form their own independent associations to take care of those problems. These independent associations should be affiliated with the American Paper and Pulp Association in order that it may effectively represent the interests of the entire industry.

5. The federated association should make a continuous effort to form constituent groups and to bring them into affiliation with it. The Secretary of the American Paper and Pulp Association may have occasion to act temporarily as secretary of the groups being formed into associations during their development stage.

6. Membership in the American Paper and Pulp Association should be confined to manufacturers and converters of paper and pulp or the products thereof, except as service divisions may be formed to bring such groups as the Supply and Equipment manufacturers and associations of other allied lines into the industry's organization structure.

7. The federated association should be financed directly by its individual member mills on a uniform basis of gross sales. Its financing should be so arranged that special requests for funds will be eliminated so far as possible.

Thus organized, the American Paper and Pulp Association may well be made a means of great strength and profit to all paper and pulp manufacturers, and a tower of strength for the future, just as the grade group associations, were intelligently operated. have unquestionably been of larger value to their members.

One of the most constructive, best organized minds in the United States, President-Elect Herbert Hoover—has set his stamp of hearty approval upon well operated trade associations. The Federal Trade Commission has shown a definite and helpful interest in them.

The Paper Manufacturers of the United States owe it definitely to themselves and to their future interests to strengthen and consolidate their own associations, so as to do for themselves unitedly what they cannot do for themselves separately.

Proposed Organization

Now as to the organization of the General Association itself, it is evident to your committee that it is now not sufficiently representative of the paper industry, not sufficiently manned, nor authoritative enough, nor well financed.

The fault does not lie with those manufacturers who have in the past unselfishly and ably worked as officers and directors of the American Paper and Pulp Association, but rather is due to the fact that in the development of the association the lack of definite policies and adequate finances has hampered the carrying out of a full and complete organization.

But we may now well look forward to the time when a man of wide experience, ability, foresight and vision, with well known executive ability, may become General Manager. If he has trade association experience and a knowledge of and acquaintance in the paper industry so much the better.

If such a man can be found there is no question of his value to the whole paper business.

He would function under a Board of Governors elected from the ablest leaders of the paper industry, with a President and Vice-Presidents.

A General Secretary would be responsible to attend to details of horizontal and vertical functions, and to assist in the organization of grade groups, leaving the time of the General Manager to be spent on the larger affairs.

Since the individual manufacturer finds it difficult to keep in touch with the general situation through correspondence or printed mail matter, it would unquestionably be of value to have a Traveling Secretary who would both discover the needs of individual members by personal contact at their plants, and interpret to them the efforts and actions of the General Association in his behalf.

Finances

Very naturally, such General Group must be adequately financed, probably in some rate of payment based on the volume of business done by individual mills.

Your Committee recommends that the detailed plan of financing be left to the Executive Committee of the Association, having in mind that the cost should be equitably distributed through the entire membership and the necessity that the dues shall be no higher than the value of the service warrants.

Conclusion

American Industry, great as it is with increasing standards of living all over the world, and in America itself, has vastly expansive possibilitiess.

The paper manufacturing position of this great industry is one of the most important, and will unquestionably grow in like proportions, if not greater, with general industry.

It seems to your committee that now is the time to consider whether we paper manufacturers shall suffer the evils of competition which come to not thoroughly organized trades, or whether organizing thoroughly and on a high plane of effective possibilities we shall make a more prosperous because a better visioned, more active and guided future.

Shall a billion dollar business go ahead with a disjointed or compact organization?

Will it go ahead best with a compact or a disjointed organization?

Realizing that with present conditions time will be necessary to accomplishment, your committee suggests that the plan of financing and the plan of reorganization be referred to the President and Executive Committee with power to act as rapidly as may seem desirable and possible.

B. A. Franklin, Chairman, Strathmore Paper Co., Mittineague, Mass.

D. C. Everest, Marathon Paper Mills Co., Rothschild, Wis.

P. S. Fiske, The Parker-Young Co., 131 State St., Boston, Mass.

C. A. Gordon, Oxford Paper Co., 200 Fifth Ave., New York, N. Y.

N. W. Wilson, Hammermill Paper Co., Erie, Pa.

S. L. Wilson, American Writing Paper Co., Holyoke, Mass.

O. M. Porter, American Paper & Pulp Assn., 18 East 41st St, New York, N. Y.

NEW BY-LAWS ADOPTED

On behalf of the executive committee, Secretary O. M. Porter proposed the following Articles of organization, which were unanimously adopted:

I. Name

This Association shall be known as the American Paper and Pulp Association.

II. Purpose

The purpose of the Association shall be to protect and promote the interests of and to safeguard and perpetuate the paper and pulp industry of the United States, and to that end the Association shall undertake:

1. To consider, investigate and take all proper and appropriate action in connection with the major problems confronting the industry as a whole, such as State and Federal legislation, tariff, taxation, raw material supplies, general statistics, research, waste utilization, costs etc.

2. To encourage and foster the organization of active working associations composed of individual manufacturing units and representing the various branches of the industry and to induce such associations to become affiliated members of this Association.

3. To represent the industry so far as may be proper before governmental bodies or departments at home or abroad whenever and wherever it may appear desirable that the industry be represented by its national association or where such representation can be effected to the advantage of the Association or the industry as a whole.

4. To formulate and foster proper cost accounting methods, to encourage profitable, legitimate and constructive methods of sales and distribution, and to foster and develop technical control and research in the paper and pulp industry.

5. To study the problem of the industry's permanent raw material supplies and to encourage the industry to develop new uses and new markets for its products.

6. To encourage and facilitate arbitration in the paper and pulp industry.

7. To do all other things which may be done lawfully for the advancement and welfare of the paper and pulp industry of the United States.

III. Membership

There shall be two classes of membership in the Association, viz., individual and affiliated.

1. INDIVIDUAL:

Any bona fide United States manufacturer or converter of pulp or paper, or the products thereof, shall be eligible to individual company membership in this Association.

2.—AFFILIATED:

Any association of manufacturers or converters of pulp or paper, or the products thereof, including associations of technical employees, salesmen, cost accountants, superintendents, and others similarly employed in the paper and pulp industry, shall be eligible to eletion as affiliated members of the Association.

3.—METHOD OF ELECTION:

Applications for membership must be submitted in writing to the Secretary of the Association in its regular membership application form. Any such application shall then be referred by the Secretary to the Executive Committee. The affirmative vote of two thirds of the members of the Executive Committee shall be sufficient to constitute election to membership. The Secretary shall notify the applicant of the action taken by the Executive Committee and if the application is approved, such

membership shall be effective upon the signing of the by-laws of the Association by the proper representatives of the applicant and the payment of its financial obligations thereby incurred as hereinafter provided.

4.—SUSPENSION OF EXPULSION:

Any individual member or affiliated association member whose conduct in the judgement of the Executive Committee, is inimical to the interests and purposes of the Association may be suspended or expelled from membership in the Association and deprived of the benefits of such membership, if so dcided by a vote of the majority of the members of the Association's Executive Committee, at any regularly called meeting, providing such member shall have been given at least two weeks' written notice of the proposed action, together with a statement of the causes for which such action is proposed and opportunity is given such member to appear before and to be heard in his or its defense.

In the event of the temporary suspension of any member such member shall not be entitled to the benefits of the Association during such period of suspension, and, in the event of the expulsion of any member, such expulsion shall operate as a forfeiture of his or its right, title and interest in and to the funds and property of the Association.

5.—RESIGNATION:

No member, individual or affiliated, may resign from the Association except by giving notice in writing to the Secretary of the Association, at least 60 days in advance of the effective date and the payment of all dues and assessments for the current fiscal year.

IV. Privileges of Members

The full privileges of membership, including copies of all general information and reports prepared by the Association and distributed to its members, shall be extended to the individual members of the Association except such data and information as may be prepared by the Association through funds provided by any limited group of its members for their specific information and use.

Members of affiliated associations shall not be entitled to the publications of the Association or to its special reports, but may received these at the discretion of the Association's Secretary.

Copies of the Association's statistical data and reports shall be sent by the Secretary to the secretaries of its affiliated associations.

V. Officers

1.—OFFICERS OF THE ASSOCIATION:

The officiers of the Association shall be a President, two Vice-Presidents, a Secretary and a Treasurer. The President and the Vice-Presidents shall be elected biennially at the annual meeting of the Association, the first such election to be held at the annual meeting in 1929 and shall serve for a term of two years or until their successors are elected and qualified. The Secretary and Treasurer (who may be one person) or such other executive officers of the Association as may be employed by the Executive Committee, shall be appointed by the Executive Committee and shall hold office at its pleasure.

2.—POWERS AND DUTIES OF THE PRESIDENT:

The President shall preside at all meetings of the Association and of the Executive Committee and shall perform the duties usually pertaining to the office of President.

3.—POWERS AND DUTIES OF VICE-PRESIDENTS:

Either of the Vice Presidents may perform the duties of the President in his absence or disability.

4.—DUTIES OF THE SECRETARY:

The Secretary shall be the Executive Officer of the Association under instructions of the Executive Committee. He shall keep proper record of all meetings and formal actions of the Association and its Committees, and shall have the custody of all its records and papers in general. He shall, to the best of his ability, keep members informed on all matters connected with the industry which accord with the purposes of the Association as defined above, and shall perform such other duties as may be appointed from time to time by the Executive Committee.

The Treasurer shall have the custody of and receive and disburse all funds of the Association. He shall keep proper books of account and shall give bond in such sum as the Executive Committee may prescribe.

VI. The Executive Committee

There shall be also an Executive Committee which shall consist of the elected officers of the Association ex officio and six other executives of the industry who shall be elected at the same time as the President and Vice-Presidents of the Association, and shall serve for a term of two years or until their successors are elected and qualified.

1. In addition to the retiring President, at least two members of the retiring Executive Committee, other than the ex officio members, shall be re-elected to membership in the Executive Committee biennial election.

2. The Executive Committee shall have general supervision and direction of all the policies, affairs, property and funds of the Association.

In case of death, resignation or other disability of any of the officers of the Association or any member of the Executive Committee, such vacancy shall be filled by the Executive Committee at any meeting at which a quorum shall be present.

VII. Nominating Committee

At their meeting to be held in September preceding each biennial election, the Executive Committee shall appoint a Nominating Committee consisting of three members, one of whom shall be a member of the Executive Committee. Such Nominating Committee shall present at the immediately succeeding December meeting its recommendations of nominations to fill the offices to be filled by election at the next biennial election. Any other nominations may be made from the floor of the annual meeting.

VIII. Legal Adviser

The Association shall employ a competent legal adviser, whose duties shall be to supervise the activities of the Association in order that they may be in accord with the state and federal legislation governing trade association activities.

IX. Meetings

The Annual Meeting of the Association shall be held during the month of February in each calendar year, unless the Executive Committee shall deem it for the good of the industry to hold the Association's annual meeting at some other time. Other meetings shall be held upon call of the President or at the written request of a majority of the members of the Association's Executive Committee, as filed with the President or Secretary.

Meetings of the Executive Committee shall be held during the months of February, May, September and December of each calendar year, or at the discretion of the President, and the date upon which the next meeting of the Committee shall be held shall be fixed at each meeting.

X. Quorum

At all meetings of the Association a quorum shall consist of one-fifth of all members of the Association. At all meeting of the Executive Committee a quorum shall consist of two-thirds of the total members of the Committee, and a majority vote shall prevail.

XI. Voting Powers

At all meetings of the Association each individual member company shall be entitled to one vote. Affiliated members shall have no vote.

XII. Finances

The Association shall be financed through annual individual company dues, at rates which shall be determined by the Executive Committee, with minimum annual dues of $50.

Affiliated association members shall pay nominal dues, to be determined by the Executive Committee of the Association, except where their membership involves special service, in which case their dues shall be determined by the Executive Committee in proportion to the service rendered.

XIII. Amendments

These Articles, or any of them, may be amended or repealed by a vote of two-thirds of the members at any regular meeting of the Association, or at any special meeting called for the purpose, provided that written notice of such amendment has been given to the members of this Association by the Secretary at least ten days in advance of said meeting.

UTILIZATION OF CELLULOSE

Dr. Charles H. Hertz, industrial consultant, New York delivered the following address in part on "Future Possibilities In the Utilization of Cellulose:

Your industry is primary concerned with the preparation, according to need, of more or less pure forms of cellulose, that chemical compound which constitutes the structural basis of the whole vegetable kingdom. But you do not occupy this field by yourself. Besides the great lumber and cotton-textile industries, there is a host of new industries dependent upon cellulose as raw material; rayon, celluloid, gun cotton, lacquers, cellophane, artificial leather, insulating material, synthetic lumber. These industries must be reckoned with more and more as time goes on.

Cotton linters represent the purest form of cellulose from natural sources, but the great tonnage of cellulose comes from our forests, the spruce of the North and the pines of the South. The right to eminence of these great sources of supply is being questioned by the annual crops such as cornstalks and sugar cane bagasse, while who could say what might happen if we should take up for serious consideration the development of that plant or tree—Bamboo—which grows at such a remarkable rate in our southern climes?

How is this Cellulose, upon which your billion dollar capitalization depends, produced in nature? This lantern slide shows you a cell section of a leaf. You will note at the top the upper epidermis, immediately below are the palisade cells, their formation easily suggesting the name, below these come the mesophyll cells and at the bottom the lower epidermis. In these latter layers there is shown one of the many stomata of the under side of the leaf, entry ports for carbon dioxide and moisture. In the palisade and mesophyll cells are small bodies known as chloroplasts, wherein is located the green pigment of the leaf. Do you realize that the chloroplast is one of the most important of all organic chemical factories? For here the carbon dioxide and water which enter through the stomata are elaborated into starch and sugar, perhaps through the intermediate stage of formaldehyde, and eventually into Cellulose. That is the basis of plant life. Animals feed upon plants, man feeds upon both. Human life, therefore, depends directly upon the efficient functioning of these chloroplast bodies.

In the operation of these tiny organic chemical factories two things are of fundamental importance, light, or solar energy, and temperature. Chemical reactions, in general, take place better at higher temperatures. Indeed, the discovery of fossil ferns in Greenland indicated plainly that this bleak land must once upon a time have enjoyed a tropical climate.

With an abundance of carbon dioxide, a normally higher temperature, and light at work more hours in the South, you can readily understand this chart showing the relative growth of trees per acre as given by the United States Department of Agriculture. The longleaf pine of the South, commonly known as Georgia pine or yellow pine, at 30 years of age on average soil grows more than four times as fast as the Spruce of the more northerly regions. It is chiefly from this pine that you manufactured last year, according to the estimates of your association, 286,000 tons of kraft paper. More striking, however, is the case of slash pine, growing more than seven times as much as spruce. Today, I wish to introduce to you more intimately this tree, also called Cuban Pine, botanically known as pinus cubensis, or as pinus heterophylla because there are sometimes two and sometimes three straws in each bundle. My main purpose today is to try to bring two industries into closer relationship, the paper and pulp industry, on the one hand, and the naval stores industry, on the other.

This slash pine is the greatest of all producers of oleoresin, from which spirits of turpentine and rosin are manufactured. Through the courtesy of Dr. Eloise Gerry of the U. S. Forest Products Laboratory I am able to show you these slides which illustrate so well the tremendous rate of growth of this pine. From this weekly scarification the oleoresin flows for a longer period than in the case of the longleaf pine, and crystalization of the eloeresin does not begin so rapidly, so that the product quickly reaches the container, thus avoiding undue evaporation of the volatile oil and discoloration of the rosin, characteristic of the oleoresin of the longleaf pine. The habitat of the slash pine is a territory extending along the Atlantic and Gulf Coasts from South Carolina to Louisiana, including the whole state of Florida. This territory embraces more than 100,000 square miles.

Dr. Mattoon, of the United States Forest Service, estimates that there are 30 million acres of cut-over lands in the pine belt of the South. These lands are of low value and much of it but poorly suited to agriculture. For many years that territory was cursed with annual ground fires. There is no danger of forest fires, in the usual sense, among these pine trees, with their long clean trunks, but the ubiquitous covering of wire grass, dying in the winter, has been annually burned over, with the consequent destruction of untold billions of young pine seedlings.

How far does all this concern you? For this reason I asked the presence here today of M. Alex Sessoms of Cogdell, Ga., who five years ago had the conviction that ground fires could be kept out of the pine woods. On a consolidated tract of 80,000 acres he has organized fire protection of the most modern type, in the belief that widespread natural reproduction, especially of the slash pine, would take place, and that on such potected land tree growth and naval stores production would be increased. These lantern slides will illustrate some of the measures he has taken,—lookout towers, fire breaks, either ploughed or intentionally burned, and fire crews well organized and determined to prevent the spread of any accidental fire in these woods. The results have been marvelous.

Driving over this property recently, my forester guide said: "Now I want to show you an ocean of saplings." Within a few minutes our machine circled a group of cypress trees and there, almost as far as the eye could reach, was a veritable ocean of young pines, four or five feet in height. It was truly an inspiring sight, indicative of what may be true some day of this entire southern region. Other adjacent timber owners have joined Mr. Sessoms in the organization of a Timber Protective Association which under the laws of Georgia is qualified to receive State aid in fire protection, B. M. Lufburrow, State Forester of Georgia, informs me that one million acres in South Georgia are now under intensive fire protection, and the official state records of 1928 show that only one per cent of this burned over last year. There are now, in South Georgia, nine lookout towers, each serving at least 75,000 acres. Intensive fire protection is already well under way in Florida, some 750,000 acres of cut-over land being so protected Mr. Lufburrow estimates that there are 15 million acres of potential forest restorations in the turpentine belt of Georgia alone.

The one other problem which confronts Mr. Sessoms is the utilization of the thinnings necessary under the prolific reforestation. What is to be done with these young pines, five to ten

inches in diameter, which must be removed to give most favorable conditions for continued growth of the remaining pines? I'll tell you the answer—utilization for wood pulp. I know full well the thought that instantly starts in your mind—"too much resin for anything but kraft paper." There is justification for this thought in the literature on this subject, for I find in the admirable bulletin of the Department of Agriculture referred to in the early part of this address, the statement, page 37, "probably too resinous for consideration" by the sulphite process and "probably too resinous for consideration" by mechanical processes. But I am a lover of facts, and I have sought in vain for a record of facts as to the amount of resin in these young slash pines. Perhaps these facts exist somewhere and are not published, but I have made inquiry of many persons who should be in a position to speak with authority on the subject and have received replies that were admittedly only opinion, and which varied anywhere from 15 down to 5 per cent.

Recently I made up my mind to get facts. I first interested Mr. Sessoms. Knowing the variation in individual pines as turpentine producers, we sought to get a fair average in order to eliminate possible individual variations. We secured from his woods thirty young Slash pines in sizes as follows:

Number of Bolts	Diameter in Inches
5	4—5
11	5—6
9	6—7
3	7—8
1	8—9
1	9—10

From these the bark was thoroughly removed, and an equal number of saw cuts, across the grain, was made from each bolt. The sawdust was thoroughly mixed and immediately placed in five tin cans of 10-gallon capacity each, with friction tops to prevent access of air. These cans were promptly shipped to the Hercules Powder Company's plant at Brunswick, Ga., where naval stores are produced by solvent extraction from pine stumps and "lightwood," and there analyzed by their chemists for the rosin contained. Results were as follows:

Per cent Rosin, on dry basis (gasoline extract)	2.09
Per cent Rosin on dry basis (alcoholic extract)	2.79

Upon receipt of this data, I wrote J. S. Kloss, manager of the Brunswick plant, asking him to have the gasoline extract titrated with a standard solution of alcoholic potassium hydroxide and the amount of rosin in this extract estimated. Under date of February 8, 1929, he wrote me: "We have made a determination for acid number, as requested in your letter of February 5th, and we find that the acid number of the extract 2.09 per cent, by gasoline, was 110.8. Using this figure, together with a normal acid number of 160 we estimate that two-thirds of the residue obtained by the extraction would be rosin, it would mean that the wood showed about 1.38 per cent rosin." Mr. Kloss rightly emphasized, in both letters, that "we must appreciate that these results are only approximate and should not be used for calculations where any great importance is attached thereto. Before such figures would be available it would be necessary to make a number of determinations, as you of course, realize."

I fully agree with Mr. Kloss in his words of caution, but I bring these results to you for the purpose of stimulating further inquiry into this most remarkable possibility. Confusion in the past has resulted from the fact that the slash pine is a fine producer of naval stores, but the further fact that the great bulk of these naval stores is produced in the outer layers of the wood after the wounding of the tree in the weekly process of scarification has been completely overlooked.

These figures may prove entirely different from the percentage of rosin in mature trees, but that is not the point. The vision that I would like to present to you is of a combination of the paper and pulp industry with the naval stores industry, particularly in this Slash Pine region, where not a question of waiting 60 years for a return on capital invested in reforestation is involved, but only a period of 10 years before cash returns from naval stores produced and from pulp wood are available. May I suggest the desirability of a group from this great industry sitting around a table with a similar group from the naval stores industry, and discussing these matters freely in order to determine if here may not lie the future for both of these great industries. You do not know the naval stores industry. They do not know your paper and pulp industry. My confident belief is that rich returns will follow such a co-operative movement.

As to the length of the fiber of slash pine I find no record, but from every analogy I think it safe to say that it will be found to be between 3 and 4 millemeters.

Only last fall I saw a carload of slash pine cones being shipped from the eastern to the western part of the southern pine belt for purposes of propagation. That is a new industry, just in its infancy. May I remind you also that the southern states are very favorable in their attitude toward tax relief for reforestation of the cut-over lands, and that in the nearby port of Savannah, Ga., there is quick access to all the eastern markets by steamer shipments and to the markets of the middle west through the network of railroads proceeding from the territory.

In this age of cellulose chemistry how are we to utilize rationally these constant additions to the annual wealth produced through solar energy? We need fundamental research on the structure of the Cellulose Molecule. Today this is unknown. The problem is being approached from three entirely different angles. In the United States Forest Products Laboratory, as shown in these lantern slides, Dr. George J. Ritter has perfected a separation of the delignified cell walls of the elm into four distinct layers. These have been further separated into fibrils and these latter finally into "fusiform" bodies. Still more wonders may be ahead of him when he reaches the still higher magnifications such as are used in the study of living tissue by Dr. Alexis Carrel.

In California, Sponsler and Dore are making use of that latest tool of scientific research, X-ray penetration of the material, and find evidence, as shown in this slide, closely conforming to chemical evidence. The chemical evidence, I regret to say, comes to us from European countries where research on such a problem receives better financial support than from us.

In Germany valuable contributions are being made by Dr. Kurt Hess and his fifteen trained chemists, supported strongly by the industry. Nearby is Professor Herzog, in a special institute, working on fiber chemistry by all of the modern physical methods. At the University of Berlin, Professor Hans Pringsheim is busy, with the backing of the wood distillation industry. In Scotland, Sir James Irvine is making notable contributions. So too in the Scandinavian countries. In Canada, as you all know, there has recently been dedicated a Research Institute whose director is Professor Harold Hibbert, supported jointly by the Canadian Paper and Pulp Association, the Canadian Government and McGill University. How pitiful by comparison, is the activity along these lines in this country of ours. Surely the day cannot be far distant when thoughtful men in your and allied industries will see to it that America does not lag behind in this rational road to progress.

Perhaps it may be through the founding of an Institute or perhaps, as in the case of the petroleum industry, through support of Cellulose research in educational institutions. Whichever form it takes, I do not hesitate to foretell an improvement of the old industries and the development of a cost of new industries as yet unborn. That is the path of progress.

WOODLANDS SECTION

The ninth annual meeting of the Woodlands Section of the American Paper and Pulp Association was held in the Sun Parlor of the Waldorf-Astoria Hotel on Wednesday, with morning and afternoon sessions.

Speaking at the morning session, M. Westveld, of the North-

eastern Forest Experiment Station, declared that wrong methods of cutting pulpwood are leaving pulpwood regions in a partly productive state.

There are three causes for this condition, he says. The first is destruction of young growth during logging, which causes losses as high as 40 per cent in future growth. The second is the practice of leaving a canopy of old hardwood trees standing after pulpwood has been removed. This retards young growth. The third cause is the present fast growing hardwood saplings which compete with and hold back similar sizes of pulpwood. All three conditions can be easily remedied, Mr. Westveld said.

Losses in advance growth caused by logging can be reduced through close supervision and inspection, he said, adding that operators must recognize the future crop values in the growing of young stock and put to an end its indiscriminate destruction. This, he said, could be done by organization and education.

"The idea of preserving young growth must be gotten across to the rank and file of the men in the woods," Mr. Westveld warned. "It seems to me that this responsibility should rest with the walking boss, who in the past has been inclined to wink at and belittle the efforts made to avoid losses of young trees. Possibly an inspector should be employed whose sole duties would consist of continually checking up to see that losses from this source are kept to a minimum."

Hardwoods, which are actually suppressing reproduction should be girdled, he said. On areas where a possibility exists of marketing hardwoods, girdling should be restricted to trees of poor form and quality. Experimental girdling plots, established by the Forest Service in 1905 in Corbin Park, N. H., in a hardwood stand containing a dense understory of spruce reproduction, show that even on this class of land girdling can be undertaken at a profit, he declared.

Elimination of young hardwood growth at the same time that stands of pulpwood are logged would relieve the third condition, Mr. Westveld pointed out.

Other able and interesting addresses were given by George N. Ostrander, of Finch, Pruyn & Co., on "Organization of Woodlands Section for Constructive Work"; J. P. Hummel, of the Hummel-Ross Fibre Company, on "The Virginia Wood Waste Survey"; C. C. Heritage, of the Forest Products Laboratory, on "Forestry and Paper Manufacture"; and John F. Preston, of the Hammermill Paper Company, on "Economic Significance of Regional Growth Rates".

A. B. Recknagel, of the School of Forestry, Cornell University, opened the afternoon program with an address on "A National Council of Timberland Owners". Mr. Recknagel set forth cogently the ideas back of a proposed National Association of Timberland Owners and how to make these ideas effective. He suggested that in place of another association there be set up a Council composed of representatives of the principal timberland owning groups—namely: 1. National Lumber Manufacturers Association; 2. American Paper and Pulp Association; 3. American Railway Association; 4. U. S. Forest Service (Dept. of Agricl.); 5. U. S. Indian Service (Dept. of Interior).

To these others may be added. The vital thing is to get a group of leaders representative of the timberland owners concentrated on the problems of timber growing.

M. Rathnagel suggested that these groups should devise the framework for a national council or other organization of timberland owners—which can then take over and carry on a gigantic task of maintaining the productivity of the forest lands of the United States. A good market with a fair margin of profit for all forest products is essential, said Mr. Rathnagel, and without it, no project no matter how favorable it may be from the timbergrowing standpoint will succeed.

L. C. Damon of the Marathon Paper Mills Company discussed "Logging Costs and Forestry." He said in part:

"The cost per cord for restocking or increasing yield of pulpwood would vary in different localities on account of quality of soils, and species of wood to be grown. There are several types of land available for growth of timber such as Hemlock-hardwood type, swamp forest lands, pine lands—both original white pine and mixed Norway white pine, and jack pine lands.

"Without going into costs, I am giving my opinion on hemlock hardwood type for continuous yield. I do not think anyone can determine the exact cost as there are so many things to be taken into consideration. I think the most practical plan of forestry should not consist in starting with cut over and ruined lands and planting new forests which will not be ready to harvest for 100 years or more.

"I think the best possible solution for continuous supply of timber on the hemlock-hardwood lands such as we have in northern Wisconsin and Michigan could be best carried out by an organization formed by a sawmill and paper mill company where each had several years supply of timber in reserve, the sawmill using the hardwoods, and the paper mills the coniferous woods. Selective logging, as I see it, is the only solution for a continuous supply for both sawmills and paper mills.

"Under selective logging in which one-third of the volume of the stand is removed, the growth that may be expected after logging will vary from 100 to 200 board feet per acre per year, according to the distribution of tree sizes left and the original volume. If, for instance, the original stand had 12,000 board feet per acre, and the proportion of trees between eleven and eighteen inches in diameter was fairly large, an annual growth of 200 board feet per acre, after removing 4,000 board feet, is not excessive. If, on the other hand, the original stand had only 6500 board feet per acre and 2500 board feet per acre were removed in the first logging, an annual growth of 100 or, at the most, 125 board feet per acre is about all that may be expected. As a general rule, a forest cut selectively will grow at the rate of from two to two and one-half per cent a year. At this rate, the timber removed in the first logging is replaced by growth within twenty or twenty-five years.

"By removing about one-third of the volume in most cases, the investment in timbered lands would be reduced by 50 to 60 per cent, and then entering the land under forest crop laws such as some of the states now have, timber growing should be a paying proposition, assuming stumpage values are the same at the time of second cutting as at present. As a matter of fact, judging by the rate of increase in the past, stumpage prices will probably double in the next forty years.

"Under permanent forest management, there are returns from at least three other sources:

1. Increase in the volume through growth,
2. Increase in the quality of the timber as the young timber increases in size, and
3. Decrease in the depreciation of the plant and equipment through the extension of their life."

Karl Swenning of the Mead Fibre Company and G. S. Kephart of the Orono Pulp & Paper Company also spoke on this subject.

Other interesting addresses were given by H. L. Churchill of Finch, Pruyn & Co., on "Selection Cutting In Pulpwood Forestry;" H. E. Brinkerhoff, of the International Paper Co., on "Cruising as an Aid in Cutting Operations," and Kendrick Burns, of the S. D. Warren Co., on "Variations in Costs of Logging Pulpwood of Different Sizes."

COST ASSOCIATION

Keen interest was shown in the twenty-second semi-annual meeting of the Cost Association of the Paper Industry, held at the Waldorf-Astoria Hotel on Tuesday and Wednesday. On Tuesday morning the proceedings were opened by President

Breck Aspinwall, whose "Address of Welcome" was timely and to the point.

The movement to establish by international consent a fixed calendar of thirteen months of twenty-eight days each was approved. The endorsement followed an address by Seth L. Bush, manager of the research department, Crocker-McElwain Company, Holyoke, Mass., which adopted the thirteen-month scheme in 1914.

Mr. Bush told the members that the company had found much of advantage in it and nothing of disadvantage as far as the internal records were concerned. The question of an extra day each year, he said, was easily met by including one five-week period about every six years.

"Many concerns have demonstrated that a calender of thirteen four-week periods is practical and advantageous," said Mr. Bush. "Its use is bound to increase. But the full benefit of such a calendar cannot be realized until it becomes common practice.

"Modern industrial management will more and more demand accurate comparison of past performance as a guide to the intelligent forecast of the future. In this process the consistencies of the present calendar, when once fully realized, will not be tolerated.

"The question of what to do with the extra day in each year and the extra two days in leap year has been sensibly answered by the suggestion that Year day be observed between Dec. 28 and January 1 and that Leap day be inserted in the same manner between two of the Summer months. The new month would be placed between June and July and would be called 'Sol.'

"It has been suggested that with a simplified calendar we might arrange to celebrate all holidays on Monday. Surely such a week-end arrangement would be a boon to millions of people. Such an arrangement would work out exceptionally well for paper mills, avoiding as it would the necessity of starting up on Monday morning, shutting down again for a holiday observed on Tuesday and then starting up again on the following day."

Warren B. Bullock, manager of the Import Committee of the American Paper Industry, discussed "Cost Facts and Tariff Making," and his address was greatly appreciated by the large gathering. He said in part:

"The practical side of cost finding was demonstrated in an interesting way at the recent hearings of the Ways and Means Committee of Congress, when the revision of the present tariff was under consideration.

"In days gone by, tariff laws were written on the basis of politics, the desires of one section for protecting leading often to excessive duties on some commodities, while other industries were less favored. Today it seems to be a fact that the writing of a tariff law will be based more on facts, and demonstrated requirements of an industry than ever before.

"During the last campaign we heard a great deal about a scientific tariff. The enactment of a purely scientific tariff law is doubtless still far in the future, but it is a fact that the present study by the Congressional committee means a closer approach to a scientifically written tariff than has ever before been the case.

"Today, the cost accountant has come into the picture as never before. The paper industry has been complimented for its presentation of its tariff requirements. The reason for this is that wherever a change in a tariff rate was asked, the paper industry endeavored to base its requests on actual statistical data. In this work the cost accountant has in a measure come into his own. The Congressional committee was pleased at the manner in which the paper industry secured the prices of a foreign laid down paper on the Atlantic coast, computed the cost of production of the comparable domestic paper, and then asked for a duty which would equalize the foreign price with the American cost. On this basis the American mill asks only an equal right to compete with the foreigner for his home market, depending on the better service that can be given by the domestic mill as compensation for the somewhat lower prices of the foreign product."

At the afternoon session, Henry B. Fernald, C. P. A., New York, gave an able address on "Recent Changes in Income Tax Law and Procedure, Particularly as Affecting the Paper Industry".

D. A. Wilcox, of the Oxford Paper Company, New York, discussed "Cost Finding and Estimating"; and J. A. C. Kavanagh, statistician of the American Paper and Pulp Association, spoke on "Association Statistics in the Paper Industry".

W. M. Fischer, of Curtis & Brother Company, Newark, Del., made the opening speech at the Wednesday morning session, taking as his subject, "The Reconciliation of Furnish to Production on a Bone Dry or Air Dry Basis." H. G. Crockett, C. P. A., followed with a thoughtful address under the slogan of "Plan Your Work and Work Your Plan".

J. A. Grimes, Engineer in Charge of Depreciation Studies, Bureau of Internal Revenue, spoke in the afternoon on "Progress in Depreciation Studies in Industries to Date", and Secretary Thomas J. Burke gave an illuminating address on "Depreciation Reserve Funds and Reproductive Values". A short business session ended the proceedings.

TRADE PRACTICE CONFERENCES

Hon. W. E. Humphrey of the Federal Trade Commission delivered the following address in part on "Trade Practice Conferences":—

The Trade Practice Conference is the cooperation of the Federal Trade Commission with an industry as a whole to rid itself of any unfair practice. This plan may be defined as one to give an industry an opportunity to clean its own house. In an industry where dishonest practices prevail, it is a plan to give the industry an opportunity to achieve decency instead of having the Government thrust decency upon it.

When a sufficient number of the members of an industry, to give reasonable assurance of its success, request it, the Commission will call a conference with those engaged in the industry, and a member of the Commission will preside over the conference. It is a conference of the industry. Those composing the industry run and control the conference. At such conference, any question may be discussed that the majority desires and that they think is of interest to the industry.

The rules or code of conduct adopted by the industry are submitted to the Commission for its approval. These rules are usually divided into two groups. What we term Group 1 rules state practices that are in violation of the law. These the Commission approves. Their approval simply means that the Commission expects the industry to observe the law. Group 2 rules are those that do not state practices that violate the law but the observance of which the industry believes would be to its advantage. We accept these rules as the expression of the industry.

Quite naturally the question arises: What is the effect of the approval of these rules by the Commission? From a legal standpoint, the effect is nothing whatever. It does not increase or diminish the jurisdiction of the Commission. It does not give to nor take from those who take part in the conference any right, privilege or immunity whatever. It does not make anything lawful that is unlawful, nor anything unlawful that is lawful. It does not change the legal effect of such rules in the remotest degree. The law cannot be changed except by an act of Congress. The Commission has no desire to in any way change the act of Congress, and the widespread impression that seems to prevail that it can do so, is entirely without foundation. The law is written. You must take the responsibility of knowing what it is, and of obeying it.

There is another point that I wish to emphasize today. Some way, somehow, there has been a persistent belief that the Commission has approved certain plans of business conduct that it is alleged that certain industries follow. Let me make it very emphatic that we approve no plan whatever—nor any proposed plan whatever. The law does not give us any such power. All suggestions or statements that the Commission has given its approval, formally or tacitly, to any plan or practice of any kind is erroneous. I wish to clear up this point as much as I can, for it is misleading both to the industry and to the public.

Another thing that I wish to emphasize today, is that of late there have been persistent whispers and confidential rumors that the Federal Trade Commission is inclined to look—if not with a friendly eye—with an unseeing eye, upon certain unlawful practices, and especially upon price fixing. This is utterly baseless. It is entirely contrary to the fact. Never in the history of the Commission has violation of the law met with stronger condemnation than it has today. Never have so many complaints been issued as are being issued today. Never has the prosecution of these complaints been carried on so vigorously as it has today. There is less excuse for violating the antitrust laws today than ever before. Recent decisions of the Supreme Court of the United States have cleared away many of the doubts and uncertainties as to the meaning of the antitrust laws. Never has the path been made so plain to the honest business man of today. For this reason, never has the Commission regarded with so little tolerance or patience the violation of the antitrust laws as it does now.

I hope that what I have said will help to clear the atmosphere of insinuations and rumors, and misunderstandings, that the Federal Trade Commission is winking at antitrust violations and is inclined to deal gently with them, and especially with price fixing.

We want to protect the public. We want to help honest business. America has declared for competition. The Commission believes in that policy, but that competition must be fair competition.

I feel that there has been a tremendous improvement in the conduct of business in this country during the last few years. But the time has not come, and I regret to say that it seems far off, when the strong arm of the Government will not be needed to protect the public from monopoly, fraud and unfair practices. The percentage of crooked business is not large, but the aggregate is far greater than it should be.

SALESMEN'S ANNUAL MEETING

The Salesmen's Association of the Paper Industry held its tenth annual meeting in the Astor Gallery on Tuesday morning. The principal speaker was Arthur S. Allen, color engineer, whose topic, "The Standardization of Process Colors," is of special importance to the entire paper industry. After the business meeting a large influx of guests indicated the general interest in this subject.

Mr. Allen is chairman of the Standardization Committee of the American Institute of Graphic Arts. This committee is now preparing a book on "Standard Process Colors" in cooperation with the American Association of Advertising Agenices, the Art Directors' Club, the Association of National Advertisers, the National Association of Photo Engravers, the United Typothetae of America, the Ink Manufacturers Association, and the International Association of Printing House Craftsmen.

About eighty national publications of first importance such as those of the Curtis Company, the Crowell Publishing Company, Condé Nast, Hearst, Harpers and Life, International Studio, Liberty, the Literary Digest, McClures, Nation's Business, Photoplay, and World's Work have adopted Standard Process Colors in all specifications for printing. Most ink manufacturers are now producing inks called "Standard Process Inks" which are being checked by the Association of National Advertisers. Engravers are marking their proofs in accordance with the newly standardized process colors.

Color, Mr. Allen said, has three dimensions, hue, value and chroma. There are five hues, or colors: red, yellow, green, blue, and purple. The spectrum heretofore used, even by Funk and Wagnall, is inaccurate. A corrected spectrum evolved by Munsell and displayed by Mr. Allen has been approved by all leading physicists.

The *value* of a color is the amount of light reflected. *Chroma* is its intensity. Comparison of Munsell's scientifically evolved chart with the spectrum formerly accepted shows marked variation in complementary or opposite colors. The combination of opposites, which balance inversely according to the products of their symbols, always produces a perfect 5-value gray, the normal sought by the human eye. Mr. Allen demonstrated this by placing discs of opposite colors variously proportioned in a rotating machine which blent the two colors to the gray labeled "5-value" on the chart.

The most successful results from advertising posters are obtained by the scientific balance of color. Mr. Allen showed posters for Bokar Coffee, Burnett's Vanilla, the Edison Company, and a very subtle one by Maxfield Parrish, to illustrate a nice balance of color. A chart of four process colors gave the effect of great variety. Five colors cannot be used in process because of the obstacle of separation. Three colors, red, yellow and blue are the maximum to be combined. Use of the new chart of these colors brings excellent uniform results as shown by color proofs sent Mr. Allen from engravers all over the country.

The movement to standardize process colors is of special value to the paper salesman whose paper has so often been blamed for botched printing jobs which were actually the fault of the inks. One color ink may not print over another, or too great a volume of one color has ruined a job—and the quality of paper is blamed, without redress for the paper manufacturer. The use of uniform inks make it possible for engravers to do harmonious jobs independent of one another throughout the country. After years of effort Mr. Allen got engravers to remake plates according to the new chart with standard process inks. His display of them compared with striking advantage over the poor heterogeneous orginals.

A chart showing a magnified dot on machine-finished, super and coated paper showed marked variation. The coated always carries a halo around the dot. Fourteen years of work have proved to Mr. Allen that the only difference in papers lies in the *construction* of ink, *not in color*. Machine-finished, for example, requires more ink. The color should not be changed for different papers, the construction of ink only should be altered.

A few ink associations were prevailed on to make new inks for the corrected chart. Their first proofs showed fugutive colors which lasted only ten days. After experiment permanent colors were obtained. Mr. Allen showed final proofs in which those parts exposed to sun tallied with those that had been covered.

"Every pressman of course puts in his own pet gooey stuff," Mr. Allen said. "Sometimes the ink is adulterated shamefully. Later when it won't dry, the paper is blamed, instead of the addition of kerosene."

Ink which has crystalized contains too much drier. There is no known carrier better than varnish, but the proportion should be 40 per cent; that of ink is always 35 per cent. Fast printing ink requires grease to prevent premature drying, then drier must be added to insure drying. Proper balance between tack and grease will bring sure results. Color should not be blamed when the ink has been improperly reduced.

The following officers were elected for 1929-30:

President—Samuel C. Knode, Albermarle Paper Manufacturing Company.

Vice-Presidents—New England Division—Thomas Compton Walsh, Hollingsworth and Vose Company; New York Division—Endicott Rantoul, International Paper Company; Miami Valley Division—Robert T. Houk, Jr., The G. H. Mead Company; Chicago Division—Harold R. Knott, Eastern Manufacturing Company.

Chairman Membership Committee, John A. Wesley, Rhinelander Paper Company.

Chairman Educational Committee, F. W. Main, Worthy Paper Company Association.

Chairman Social Committee, R. D. W. Ewing, American Writing Paper Company.

Secretary-Treasurer, D. A. Crocker, 18 East 41st street, New York.

RESOLUTIONS

Frank L. Stevens, chairman of the Resolutions Committee, presented the following resolutions, all of which was unanimously adopted:

Forest Research

WHEREAS, the United States government has established a ten-year program of forestry research, under the McSweeney-McNary Act, and

WHEREAS, the American paper industry is dependent upon the forests for its basic raw material, and

WHEREAS, the paper industry is undertaking extensive studies of the practicability of forestry under varying conditions, be it

RESOLVED, that the American Paper and Pulp Association, recognizing the vital importance of adequate appropriations as authorized by McSweeney-McNary Act, urges Congress to raise the appropriations for research in pulp and paper at the Forest Products Laboratory to the total alloted under this act as soon as possible; in order that forest owning companies may have adequate and timely information which can be used as a basis for forest management policies.

Foreign Trade

WHEREAS, The American paper industry is capable of producing more than enough paper of certain grades to meet domestic requirements, and

WHEREAS, there is opportunity for cooperate development of export trade under the Export Act, be it

RESOLVED, that the American Paper and Pulp Association, acting in cooperation with the United States Department of Commerce, encourage the formation of Export Associations to facilitate a substantial export of paper and paper products.

Statistics

WHEREAS, accurate and continuous statistical information is necessary to indicate to manufacturers and converters the varying conditions of supply and demand, stocks, distribution of mill capacity for the manufacturer of all kinds of paper and paper products, and

WHEREAS, the general statistical requirements of the industry are being determined and met by the Statistical Department of the American Paper and Pulp Association to the limit possible under available funds and existing conditions of cooperation, and

WHEREAS, the Statistical Department of the American Paper and Pulp Association is in active cooperation with the Bureau of the Census of the Department of Commerce, be it

RESOLVED, that the American Paper and Pulp Association recognize the advantages of concentration of statistical work in its Statistical Department; That the Association cooperate with the Bureau of the Census to hasten the publication of census data, to clarify and broaden the census classifications, to assist in the conduct of an annual census of production and mill capacity, and to facilitate the conduct of the recently authorized census of distribution.

Federal Control of Production

Whereas, a bill known as the Watson Coal Bill is now pending before the Congress of the United States, providing for the establishment of a commission to govern the bituminous coal industry by fixing prices, by assigning markets, and by dictating the details of mine operation, equipment, labor employment, and other matters, and

WHEREAS, such control goes beyond government regulation and practically substitutes government operation in one of our greatest industries, and

WHEREAS, this bill would set a new precedent which might ultimately be extended to all industries, be it

RESOLVED, that the American Paper and Pulp Association voices its disapproval of the principles involved in the Watson Coal Bill and urges the preservation of the sound relationship between the government and the business activities of the citizens of the United States, which have existed so successfully since the establishment of independent government.

Calendar-Simplification

WHEREAS modern industry has to make constant use of comparative data for the proper guidance of its affairs, the value of which data is greatly impaired because of defects in the present calendar, and

WHEREAS the proposal for an International Fixed Calendar of 13 equal months, would not only remedy these defects, but would offer advantagess in many ways to all our citizens, and

WHEREAS a bill has been introduced by Chairman Stephen G. Porter of the House Committee on Foreign Affairs, entitled House Joint Resolution 334, requesting the President to propose the calling of an International Conference for the "Simplification of the Calendar," or to accept on behalf of the United States, an invitation to participate in such conference, be it

RESOLVED, that the members of the American Paper and Pulp Association in session at their Annual Meeting, on Thursday February 21st, hereby endorse the proposal for an International Conference on "Calendar Simplification" as embodied in House Joint Resolution 334, and instruct their Secretary to communicate such action to Chairman Stephen G. Porter of the House Committee on Foreign Affairs and to Mr. George Eastman, Chairman, National Committee on Calendar Simplification for the United States.

In Memoriam

WHEREAS, in the wisdom of Almighty God, leaders of the industry have been taken from our councils during the past year, be it

RESOLVED, that the Association voices its sorrow at their loss and its appreciation of their constructive work for the industry.

Among those are:

Minor M. Beckett, Beckett Paper Company

D. W. Bergstrom, Bergstrom Paper Company

Raymond D. Bertschy, American Envelope Company and Miamisburg Paper Company

Howard L. Blake, Fort Hill Paper Company

George J. Caldwell, American Writing Paper Company

W. L. R. Durkee, Schroon River Pulp and Paper Company

L. L. Leadbetter, Oregon Pulp and Paper Company and Columbia River Mills

H. W. Martin, Martin Pulp and Paper Company

Levi S. Nold, American Writing Paper Company

John L. Perkins, American Tissue Mills, Inc.

James M. Ramage, Franklin Paper Company

W. H. Sullivan, Bogalusa Paper Company

U. M. Waite, Analomink Paper Company

Henry J. Wantland, Terre Haute Paper Company

James P. Monroe, Monroe Felt and Paper Company

W. F. Robertson, Robertson Company, Hinsdale, N. H.

WAXED PAPER ASSOCIATION

The annual convention of the American Waxed Paper Association was the most largely attended in the history of the organization, forty-three manufacturers, representing twenty-seven mills, being in attendance.

Federal trade practice procedure was the principal subject of discussion, following out the recent conferences of the manufac-

turers with governmental officials, and two slight corrections were made in the rules submitted for acceptance. There was also a temporary postponement of action on the rule concerning ink coverage. The remainder of the program of procedure was adopted without change.

Other subjects discussed in the initial session were improvement in statistical reports, and the compilation of statistics, and reports on the credit, tariff and transportation situations were presented.

The second general session was devoted to a conference with representatives of the baking industry, and a program outlined for mutual cooperation between the two industries. This program will be discussed further, in the hope of eventual formal cooperation.

Officers elected were:

President—George H. Gardner, Menasha Products Company, Chicago, Ill.

Vice President, S. J. Eisner, Newark Paraffine Company, Newark, N. J.

Manager-Treasurer—Paul S. Hanway, New York.

Executive Committee—Winthrop L. Carter, Nashua Gummed and Paper Company, Nashua, N. H.; R. B. Donnelley, Central Waxed Paper Company, Chicago, Ill.; Karl Zimmer, Otsego Waxed Paper Company, Otsego, Mich.

PAPER SALESMEN'S LUNCHEON

One of the most successfull events ever arranged by the Salesmen's Association of the Paper Industry was the excellent luncheon which was held on Tuesday afternoon in the Sun Parlor of the Waldorf-Astoria Hotel.

President James H. Coy made an efficient toastmaster and kept the large gathering in the best of good humor throughout the proceedings.

The luncheon was enlivened by an excellent little orchestra, which rendered numerous popular selections—both old and new—to the delight of the multitude.

An outstanding event of the program was the address of the principal speaker, P. H. Whaley, of the Whaley-Eaton Service, Washington, D. C., who took as his subject "Business Under the New Administration."

Mr. Whaley discussed the personality and policies of President-Elect Herbert Hoover and predicted greater prosperity in this country than we have ever known, under his administration during the next four years.

The workings of the Federal Reserve Board were also explained by Mr. Whaley and at the close of his speech the audience applauded him again and again.

Before the termination of the proceedings the retiring president, James H. Coy, handed the gavel to his successor, S. C. Knode. The new president was very warmly received and expressed his appreciation of the confidence of his fellow members in a few well-chosen remarks.

SUPPLY AND EQUIPMENT SECTION

The Supply and Equipment Section of the American Paper and Pulp Association held its annual meeting on Tuesday, with a luncheon in the old Astor family dining room of the Waldorf-Astoria. A round table discussion followed the luncheon, which brought out many interesting features of the work being accomplished by the section, and the prominent part its members take in furthering the interests of the industries as a whole. Plans were made for a membership drive which should bring into the fold every manufacturer of mill equipment and raw materials. President W. N. Wilkinson reviewed the accomplishments of the section since its organization, emphasizing on the exceptional position the members occupied of being of real assistance to the manufacturers of pulp and paper. Secretary O. M. Porter spoke of the prominent part the section took as a unit of the American Paper and Pulp Association in the recent tariff hearings at Washington.

Among those present were H. C. Barbour, of the International Pulp Stone Company; J. A. Cameron, of Cameron Machine Company; W. W. Cronkhite, of the General Electric Company; Phillips Dennett, of Bird Machine Company; Chas. L. Ellis, of the Downingtown Manufacturing Company; Eugene Merz, of Heller & Merz; H. C. Strike, of the Combustion Engineering Company; Geo. Spencer, of the Minton Vacuum Dryer Corporation; E. B. Fritz, of *Paper Industry;* J. Cornell, of *Paper Mill and Wood Pulp News;* W. H. Millspaugh, of Paper & Textile Machinery Company; A. A. Tanyane, of the PAPER TRADE JOURNAL.

U. S. PULP PRODUCERS ASSOCIATION

The annual meeting of the United States Pulp Producers Association took place on Tuesday afternoon with election of the following officers for the ensuing year:

President, W. H. Savery, Shenandoah Pulp Company, Harpers Ferry, W. Va.

Vice-President, Norman S. Stone, Mosinee Paper Mills, Mosinee, Wis.

Secretary-treasurer, O. M. Porter, 18 East 41st street, New York.

Executive Committee: D. C. Everest, Marathon Paper Mills Company, Rothschild, Wis.; J. P. Hummel, Hummel-Ross Fibre Corporation, Hopewell, Va.; George W. Sisson, Jr., Racquette River Paper Company, Potsdam, New York; J. M. Ward, Detroit Sulphite Pulp and Paper Company, Detroit, Mich.; Norman W. Wilson, Hammermill Paper Company, Erie, Pa.

TISSUE PAPER ASSOCIATION

The annual meeting of the Tissue Paper Manufacturers Association was held Tuesday morning. Attendance was good and many subjects of interest to the makers of tissue were discussed, bearing upon prevailing conditions and prospects for the coming year. The following officers were elected:

President, E. W. Kiefer, Port Huron Sulphite & Paper Company, Port Huron, Mich.

Vice-Presidents, J. M. Conway, Hoberg Paper and Fibre Company, Green Bay, Wis.; W. A. Wheeler, A. P. W. Paper Company, Albany, N. Y.

CARDBOARD ASSOCIATION

The meeting of the Cardboard Manufacturers Association at the Waldorf-Astoria Hotel on Wednesday attracted a large and enthusiastic gathering, and many matters of vital interest to the industry were freely discussed. The officers were re-elected as follows:

President, Donald Lowe, Lowe Paper Company, Ridgefield, N. J.

Vice-President, Carl Schneider, American Coating Mills, Elkhart, Ind.

Treasurer, H. W. Suter, Champion Coated Paper Company, Hamilton, Ohio.

Secretary, Kendall Wyman, Falulah Paper Company, 2302 Woolworth Building, New York.

Executive Committee: Donald Lowe, Lowe Paper Company, Ridgefield, N. J.; Raymond Bee, United Paperboard Company, Wabash Division, New York; Lowell Emerson, Rhode Island Cardboard Company, Pawtucket, R. I.

WRITING PAPER ASSOCIATION

At the annual meeting of the Writing Paper Manufacturers Association on Wednesday morning, officers for 1929 were elected as follows:

President, D. K. Brown, Neenah Paper Company, Neenah, Wis.

Vice-Presidents, B. A. Franklin, Strathmore Paper Company, Mittineague, Mass.; C. B. Clark, Riverside Fibre & Paper Company, Appleton, Wis.

Secretary-Treasurer, E. H. Naylor, 44 Vernon street, Springfield, Mass.

Executive Committee: D. K. Brown, B. A. Franklin, C. B. Clark, Stanley W. Morse, Valley Paper Company, Holyoke, Mass.; Harold W. Hixon, Chapin & Gould, Springfield, Mass.; Ward Howard, Howard Paper Company, Urbana, Ohio; A. E. Oberweiser, Whiting Plover Paper Company, Stevens Point, Wis.

NATIONAL KRAFT MANUFACTURERS

The annual meeting of the National Kraft Paper Manufacturers Association was held on Wednesday morning in the Tea lounge of the Waldorf-Astoria. Approximately 75 per cent of the total production of Kraft paper in the United States was represented and much time was given to the discussion of the problems of the industry and their solution. Routine business was also transacted and the present officers were reelected as follows:

President, J. P. Hummel, Hummel-Ross Fibre Corporation, Hopewell, Va.

Vice-President, John E. Alexander, Nekoosa-Edwards Paper Company, Nekoosa, Wis.

Pending the selection of a permanent secretary, Louis Bittner of Central Paper Company, Muskegon, Mich., is acting as secretary pro tem.

SULPHITE PAPER ASSOCIATION

Several informal meetings were held during the convention week by the newly formed National Sulphite Paper Manufacturers Association.

The following were recently elected officers of the association:

President: J. M. Ward, Detroit Sulphite Pulp and Paper Company, Detroit, Mich.

Secretary: R. T. David, Indianapolis, Ind.

Executive Committee: J. M. Ward; R. L. Sisson, Jr., Racquette River Paper Company, Potsdam, N. Y.; John E. Alexander, Nekoosa-Edwards Paper Company, Port Edwards, Wis.; J. L. Stille, Continental Paper and Bag Mills Company, New York City; and E. L. Edmonds, Wausau Paper Mills Company, Wausau, Wis.

COVER PAPER ASSOCIATION

At the annual meeting of the Cover Paper Manufacturers Association, held at the Waldorf-Astoria Hotel, on Tuesday last, the following officers were elected for the ensuing year:

President: B. A. Franklin, Strathmore Paper Company, Mittineague, Mass.

Vice-President: J. B. Shepherd, Peninsular Paper Company, Ypsilanti, Mich.

Secretary-Treasurer: E. H. Naylor, 44 Vernon street, Springfield, Mass.

Members of the Executive Committee: B. A. Franklin, chairman; J. B. Shepherd, W. H. Howes, Knowlton Brothers, Inc., Watertown, N. Y.

BRISTOL BOARD MANUFACTURERS

An informal conference of the Bristol Board Manufacturers was held at Room 114, the Waldorf-Astoria Hotel, on Wednesday morning. The meeting was well attended and the discussions regarding trade problems proved very interesting to the manufacturers present. The Bristol board manufacturers have no regular association, but nevertheless constitute a rather important branch of the paper industry.

FINE AND SULPHITE BOND DIVISIONS

Separate conferences of the Fine Paper and Sulphite Bond Divisions of the Writing Paper Manufacturers Association were held on Wednesday afternoon with the vice president of the regular association presiding.

Attendance at the meetings was excellent, and the usual discussion of trade problems affecting the various grades of paper was thoroughly covered.

TAPPI ELECTION OF OFFICERS

The annual election of officers of the Technical Association of the Pulp and Paper Industry resulted as follows:

President, P. H. Glatfelter, P. H. Glatfelter Company, Spring Grove, Pa.; Vice-President, Maxmillian Krimmel, Hammermill Paper Company, Erie, Pa.; Secretary-Treasurer, R. G. Macdonald, 18 East 41st street, New York.

Executive Committee: R. H. Laftman, Bogalusa Paper Company, Bogalusa, La.; Robert Bell-Irving, Powell River Company, Powell River, B. C.; John Traquair, Mead Pulp & Paper Company, Chillicothe, Ohio; Ralph A. Hayward, Kalamazoo Vegetable Parchment Company, Kalamazoo, Mich.; W. O. Johnson, Strathmore Paper Company, Mittineague, Mass.

SOUTHERN KRAFT ASSOCIATION

Meetings of the Southern Kraft Association, held on Monday and Wednesday afternoons brought a good attendance and many matters of importance to this branch of the industry were discussed. Officers for the past year were reelected for 1929-1930 as follows:

President, A. C. Goodyear, Bogalusa Paper Company, Bogalusa, La.

Vice-President, P. M. Tallon, Hummel-Ross Fibre Corporation Hopewell, Va.

Secretary-Treasurer, C. E. Dobson, 1007 New Orleans Bank Building, New Orleans, La.

APPOINTED ASSISTANT SECRETARY

Official announcement was made during the meeting of the appointment of C. W. Boyce, secretary of the Woodlands Section of the American Paper and Pulp Association, as assistant secretary of the latter organization in addition to his other duties.

Since coming from the Forest Service to the paper industry a year ago, Mr. Boyce has been assisting Mr. Porter in the conduct of Association affairs, and his work has been recognized by the formal appointment announced by Mr. Porter after the approval of the Association's executive committee.

TISSUE COMMITTEES CONFER

Conference Committees of the Tissue Paper Manufacturers Association and the National Paper Trade Association, and representatives of the Department of Commerce, met in Room 112 of the Waldorf-Astoria Hotel, on Monday afternoon, when a very interesting and informative session was held.

CONVERTING PAPER MILLS ASSOCIATION

The Converting Paper Mills Association met at the Waldorf-Astoria Hotel on Tuesday morning. A number of trade problems were discussed and various subjects of interest to the members of the association were thrashed out. There was an excellent attendance.

WASTE UTILIZATION LUNCHEON

The National Committe on Waste Utilization and Stream Improvement held its first luncheon on Wednesday afternoon at the Waldorf-Astoria, at which matters of interest to the committee were freely discussed.

GUMMED INDUSTRIES LUNCHEON

The Cloth Tape Manufacturers group of the Gummed Industries Association held a very successful luncheon on Monday afternoon at the Waldorf-Astoria Hotel. Matters of interest to the members were freely discussed by those present.

PAPER TWINE SPINNERS

An informal meeting of the leading paper twine spinners was held on Tuesday afternoon, February 19, at the Waldorf-Astoria Hotel. Various matters of interest to the paper twine industry were freely discussed by those present.

TECHNICAL ASSOCIATION MEETS

Fourteenth Annual Convention of the Technical Association of the Pulp and Paper Industry Is Held at the Waldorf-Astoria Hotel, New York

P. H. Glatfelter, Vice President and Treasurer of the P. H. Glatfelter Company, Spring Grove, Pa., Is Elected President—Reports of the Officers Show That the Association Is In An Unusually Sound Condition—Increase in Membership Has Been Greatest In Any Single Year in the History of the Association—Influence Abroad Is Attested by Large Addition To Membership from Foreign Paper Mill Centers.

THE TECHNICAL ASSOCIATION of the Pulp and Paper Industry held its fourteenth annual convention February 19-21 at the Waldorf Astoria Hotel. The convention was the most largely attended in the history of the association and was an unusual success from every viewpoint.

PRESIDENT'S ADDRESS

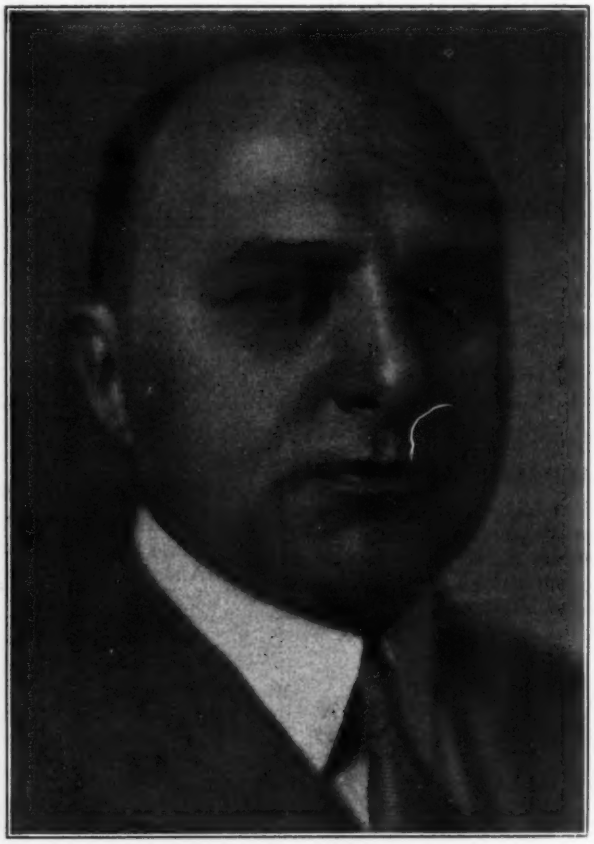
E. C. Tucker, president of the association, delivered his annual address as follows:

It is with a high feeling of optimism that I welcome the members and friends of the Technical Association to this, the opening of our fourteenth annual meeting. Never has your association been in a more favorable position to be of service to our industry and never have the paths of that service been more clearly outlined ahead of us. We have made splendid progress during this last year, and it is a source of great satisfaction to us all that the name of our Association continues to merit enlarged influence in the Pulp and Paper Industry. With our membership increasing so rapidly we must keep constantly in mind the goals we wish to reach; and the work of the association must be clearly outlined so that new members may be promptly assimilated and may be immediately imbued with the generous and helpful attitude that characterized the early years of the Association's work.

Standing Committees

The accomplishment of the association is the accomplishment of the standing committees. They are the foundation on which the association has been built and their work is the most important work the association does. While not always spectacular, we must take great care that the work of these committees is thoroughly supported and that the chairmen are properly backed up in their efforts by alert and willing committees. I can not urge upon you too strongly tthe necessity of each of you taking an active part in this work. Our association is indebted to the men who have given so freely of their time and thought to these committees during the past year, and for the association, I want to thank them and assure them of our continued deep interest in and enthusiasm for the tasks to which they have set themselves. The sectional meetings under these committee heads will be so full of interest, that we can none of us afford to miss them. Please be prompt in your attendance on these meetings as the schedules are very full and the time limited.

The fall meeting of the association was held in Wausau, Wis. The attendance was large and the meeting a distinct success. The highest credit is due to the men responsible for the excellence of that meeting and we take this opportunity to express to them our appreciation of their excellent work. The hospitality of the manufacturers in that section added much to the success of the meeting and in behalf of the Technical Association I extend to them our keen appreciation of their courteous welcome.



P. H. GLATFELTER, PRESIDENT

We have heard much concerning activities in the pulp and paper industry in that section of our country bordering the Pacific Ocean. There is now in the process of formation a Pacific Coast Section of our association which we expect will be very close to TAPPI but which of necessity must have certain freedom. It now seems certain that mutually satisfactory arrangements can be completed and that not later than this fall the Pacific Section of TAPPI will be an established organization.

Foreign Members

I want at this time to call the attention of the members to the large increase in our membership in foreign countries. We have had many applications and are very proud of the type of men who are applying for membership from these countries.

There is now before the Executive Committee of the American Paper and Pulp Association, a plan for a realigning of that association and of all the associations affiliated with it. Your executive committee has been thoroughly informed of these plans and is desirous of full cooperation with the American Paper and Pulp Association in this or any plan which can be of benefit to the industry. However, your committee fully recognizes the necessity of a very careful study of any such plan, and a careful determination of how any proposed plan might affect the ability of this association to be of greatest helpfulness to its members and to the industry

Finances

The finances of our association are in excellent condition and your committee now feels justified in adding somewhat to our budget. A thing that we are desirous of doing is to partly finance a fellowship at the Forest Products Laboratory in Madison, Wis. Your committee has felt that this should not be undertaken except on a three year plan and we now propose to appropriate the sum of $1000 annually for three years for this work and at a later session of this meeting we would like your ratification of this proposal. This work will be carried out in conjunction with the American Paper and Pulp Association and the Forest Products Laboratory. It opens up a field of wide possibilities and is, we believe, a logical undertaking for this association.

Service to Members

This report would not be complete without mention of the continued successful operation of the Service to Members Plan. This Feature of our work has been of great value and is being widely used by our members. There is one other service rendered by our secretary to which I believe it is well to call your attention. While we do not in any sense run an employment bureau, we do often find it possible to bring together men who are looking for positions and those who are looking for men. When you need service of this kind you will always find it worth while to inform the secretary of what you want.

Bibliography of Paper Making

During the year just past there has been one outstanding contribution to the literature of Papermaking, i. e., a "Bibliography of Paper-making," by Clarence J. West. Too much cannot be said of the untiring efforts of Dr. West in this remarkable piece of work and as president of this association I take pleasure in commending Dr. West for the painstaking care and thorough excellence of this book.

This meeting completes the second year of my term as president. I cannot withdraw from this position without expressing to you my sincere thanks for the fine spirit of the members, and the helpful and inspiring support of the officers who have served with me. The immediate prospects of the association are bright and we are all expecting great things of the year 1929.

REPORT OF THE SECRETARY

R. G. Macdonald, Secretary of the association presented his annual report as follows:—

The records for 1928 show several events of outstanding importance in the history of the Technical Association. These include the following:

The greatest increase in membership for any single year.

A great improvement in financial status.

The recognition of outstanding merit relative to the technical development of the industry and the first presentation of the Gold Medal of the Association.

The publishing of four valuable books.

The holding of the best attended and most interesting Fall Meeting.

An increasing interest in the inquiries handled under the Service to Members plan.

The holding of a pulp and paper conference on the Pacific Coast in preparation for the founding of a Pacific Coast Section of TAPPI; and the appointment by the American Paper and Pulp Association of an Advisory Committee to the Forest Products Laboratory, made up of members of the Technical Association.

There were 187 new members elected in 1928. On December 31, 1928 the membership consisted of 598 Active, 208 Associate, and 95 Junior members, or a total of 901. There were 47 resigned or dropped. Fourteen pulp and paper companies joined the Association as Corporate Members of which there are now 68. The international recognition of the Association is evident in the geographical distribution of its new members of all classes.

Increasing Interest in Special Inquiries

During 1928 there were 23 Special Reports prepared under our Service to Members plan. As will be shown in the list which follows, these dealt with important manufacturing and technical problems proposed by members in the various mills. Particularly noteworthy is the increasing interest that is being shown by members in contributing records of experience and other data to these reports.

In addition to the value received by participants in these surveys through the exchange of information, there is the benefit that can come to anyone as a result of investigating the problem from the standpoint of his own company. In many instances the problems presented have revealed to many a similar local mill situation that should be examined.

List of Special Reports Prepared in 1928

1. No. 91—Sulphur Dioxide Recorders
2. No. 92—Offset Paper
3. No. 93—Pulp and Paper Machine Drier Temperatures
4. No. 94—Control of Beating by Freeness Testing
5. No. 95—Bleaching Sulphite at High and Low Densities
6. No. 96—Old Papers and Their Recovery
7. No. 97—Handling 100% Sulphite Sheet on the Paper Machine
8. No. 98—Use of Suggestion Boxes
9. No. 99—Shiners in High Finish Paper
10. No. 100—Sulphite Production Variables
11. No. 101—Starch as a Beater Furnish
12. No. 102—Disposal of Waste Carbon from Soda Pulp Mills
13. No. 103—Heat Transfer from Paper Machine Driers
14. No. 104—Cleaning Flat Screens
15. No. 105—Value of the Smoothing Press in Making Sulphite or Groundwood Specialties
16. No. 106—Brittleness of Paper
17. No. 107—Digester Insulation and Heat Savings
18. No. 108—Sulphate and Soda Mill Effluent Losses
19. No. 109—Paper Testing Survey
20. No. 110—Lost Time and Wire Costs in Cylinder Equipment
21. No. 111—Operating Data for Drier Canvas
22. No. 112—Factors Affecting the Strength, Finish and Snap of Paper
23. No. 113—Rescreening of Sulphite Pulp

An effort has been made to increase the value of the Special Reports by summarizing the facts brought out in the contributions. In doing this no attempt is made to draw conclusions but rather to present the significant facts so that they may be quickly referred to. It is recommended that the Standing Committees of the Association pay particular attention to the inquiries handled under the Service to Members plan and do such cooperative work as will make the Special Reports of the greatest value to all who receive them.

The Fall Meeting at Wausau

It is doubtful if any community has any more to offer to a Convention such as TAPPI'S than Wausau, Wis., where the Fall Meeting was held on September 25-27, 1928. The remarkable success of the meeting can be largely attributed to the indefatigable

efforts of Allen Abrams and his associates on the Convention Committee. The attendance, 310, was about double that of the best attended previous Fall Meeting. In addition to a technical program in which 28 papers were presented and discussed in three symposiums covering Waste, Technical Control and Forest Products Research. Opportunities were provided for visiting the several mills and equipment plants and a program of recreational activities helped to make the meeting one of much profit and pleasure to all who attended. (Detailed description of the events of the meeting appeared in the PAPER TRADE JOURNAL, October 4, 1928).

The Technical Association Medal

In addition to the honorable mention bestowed upon Ogden Minton and W. H. Mason at the last annual meeting for achievements that have definitely contributed to the progress of the industry, the association further honored these men by presenting them with the first Technical Association Medals ever presented. These were given on September 26, 1928 at the Wausau meeting.

Four Books Published

Through the cooperation of the Lockwood Trade Journal Company, the Technical Association has been able to publish four bound volumes. These include

Paper Testing Methods
Chemistry of the Sulphite Process
Paper Making Materials
Biblography of Paper Making 1900-1928

The association is indebted to George S. MacDonald for taking the financial risk relative to these books; to Clarence J. West for preparing the last two and to Henry J. Berger, editor of the PAPER TRADE JOURNAL, for taking care of the many publishing details. The association members should support these publishing undertakings by purchasing these volumes.

The Pacific Coast

The growth of the industry on the Pacific Coast and its endeavor to operate on the highest technical standards has been reflected in the existence of a large group of technical executives, superintendents, engineers, and chemists who are members or qualified to become members of the association. This group met on October 26, 1928 at the University of Washington to read and discuss technical papers. Following the meeting, a conference was held to consider a plan of organization. It was decided to appoint an Organizing Committee consisting of H. K. Benson, W. E. Breitenbach and C. R. P. Cash. On January 12, 1929 this Committee, together with a Resolution Committee consisting of R. Bell-Irving, E. P. Brennan and M. W. Black, recommended among other things, that a Pacific Coast Section of TAPPI be organized.

In Kalamazoo the Paper Technologists Club under the presidency of Ivar Lunbeck has held several meetings throughout the year, as well as an excellent interstate conference, in June, 1928. although this organization is not affiliated with TAPPI, it is made up almost entirely of members of the Technical Association and has done much for the Technical Association and the paper industry in the Kalamazoo Valley, by developing local interest in technical development. The members of the club are enthusiastic supporters of and participants in the activities of TAPPI.

RONALD G. MACDONALD, SECRETARY

Relations with Other Organizations

As a service organization the Technical Association must necessarily have frequent contact with many of the organizations of the industry. Its opportunities to serve and receive service from the American Paper and Pulp Association are frequent and advantage is taken of such opportunities to further the intimate and friendly relations between the two bodies. As a result of recommendation by TAPPI A. P. & P. A. is carrying on investigations relative to waste utilization and steam improvement. A committee composed of TAPPI members was appointed in May, 1928, to represent the A. P. & P. A. as an Advisory Committee to the United States Forest Products Laboratory. Research activities have been engaged in by several companies and associations as a result of the Technical Association committee activities. Particularly noteworthy is the work being done in studying the quality of cellulose fibers from various sources. Closer contact has been built up with the organization similar to TAPPI outside of the United States.

American-Scandinavian Foundation

The association has for a few years sponsored a movement whereby young technical men of America may be employed for a period of one year in Scandinavian mills and a similar courtesy extended to the young technical men of the Scandinavian countries.

During the past year the Bogalusa Paper Company; Chemical Paper Manufaciuring Company; The Marathon Paper Mills Company, Nekoosa-Edwards Paper Company; and the Container Corporation of America, have taken industrial fellows into their employ and many mills have extended the privilege of visiting their plants for brief periods. On the other hand, two companies in Sweden, Holmens Bruks A/B at Hallstavik, and Kramfors A/B at Kramfors, have accepted American fellows, namely John F. Ohlson and W. F. Gillespie, respectively. Such an exchange of students should result in increased good will between the Scandinavian and American pulp and paper industries.

Employment

Although the Association does not operate an employment agency, it has been able to act as an employment clearing house and has been able to keep most of its members satisfactorily employed.

Committee Activities

In this report no attempt is made to review the work of all

our committees, of which we last year had 17. Particular comment should be made concerning the progress of new committees and recommendations may also be made regarding future work for the committees to consider.

To take care of a broader field than that covered by the Committee on Coated and Processed Papers, a new Committee on Fine and Special Papers was formed. It is the purpose of this Committee to investigate the major technical problems of the finer grades of papers. Such problems deal with deterioration, permanence, special treatment, etc.

A new committee on Waste and Corosion was organized to continue studies on white water and to consider other major wastes such as corrosion, heat losses, etc. Under the leadership of H. L. Joachim, the committee has made a comprehensive survey of white water wastes in book and board mills and has begun an important investigation into the subject of corrosion and the ways in which it may be combated.

Pulp Testing

Until this year the work done on determining pulp testing methods was handled by the Sulphite Pulp Committee. To concentrate more fully on this subject a Committee on Physical Standards for Pulp was formed. So important is the pulp testing project from the international standpoint that no efforts should be spared to effect the solution of the problem.

It is gratifying to note the rapidly increasing interest that is being taken by paper board mills in their technical and manufacturing problems. This interest has led to the formation of a Committee on Paper Board. The enthusiasm that is at present in evidence should result in important accompishments during the next few years. It is recommended that the manufacturing problems relating to roofing felt be handled by this Committee and that the methods of testing roofing felt be taken care of by the Paper Testing Committee.

It is recommended also that the Committee on Materials Handling be merged with the Heat, Light and Power Committee and inasmuch as the name of this Committee is not sufficiently descriptive of its activities it is further recommended that it be known as the Committee on Power and Mechanical Engineering.

In general it is hoped that each committee will undertake the consideration of definite projects each year and if necessary to subdivide the committee organization to adequately deal with such problems. A worthwhile service to the industry by each committee would be the embodiment in their annual reports of the record of technical progress in their particular fields of interest. An effort should also be made to build up a divisional organization so that every member of the Association may be given an opportunity to participate in the activities of the committees in which they are most interested.

Management Methods

Inasmuch as association members in the industry are entering positions as technical executives, superintendents, etc., it may be found profitable to organize a new committee to deal with management problems. If sufficient interest is shown in regard to this suggestion such a committee may begin its existence immediately following the Annual Meeting this year.

Acknowledgments

In his work, the Secretary must enlist the aid of many members and others. For this he is grateful and has endeavored to acknowledge such assistance at the time it was given. He is particularly indebted to W. G. MacNaughton, the members of the Executive Committee, the U. S. Forest Products Laboratory staff, B. W. Scribner and E. O. Reed and to C. M. Baker, Engineer, American Paper and Pulp Association.

Outlook for Business and the Paper Industry *

By Dr. E. O. Merchant, Statistician, G. H. Mead Co.

A year ago I had the pleasure of addressing you on the subject of business forecasting, in the course of which I ventured to make some predictions about the outlook for the paper industry in 1928. Fortunately for you, but unfortunately for me, my optimistic forecast of the expected increase in consumption turned out to be partially correct. As a result, I am now called on the carpet to repeat the performance as respects the new year 1929.

As a starting point for such a forecast, we must remember that the paper industry is essentially a cyclical industry. When business is active and prosperous, more paper is bought and used, and vice-versa, when business is depressed, less paper is bought and used. So our first inquiry must be regarding the business outlook for 1929 in general.

We have begun the new year with business activity at a relatively high level and still expanding. At this time last year the recovery was just getting started, following the 1927 slump, which came to an end in November of that year, after Henry Ford had brought his new model on the market. The recovery which we noted last February continued with only one or two months of hesitation throughout the year. It was not rapid, but fairly steady and fairly general. This recovery may be attributed largely to expanding activity in the automobile industry, which was reflected to almost all other lines of business. Unquestionably the large deferred demand for automobiles carried over from 1927, furnished the stimulus and the basis of much of our prosperity in 1928.

At the present time it is quite apparent that the automobile industry is still leading the procession and, as was the case a year ago, the future of business in general depends to a large extent upon the future of the automobile industry. It is estimated that 400,000 cars and trucks were produced in the United States and Canada during January, a new high record for this month of the year, and there is little doubt but that this key industry will continue to hang up new high records for the next three or four months at least. Record activity in this industry means a large volume of business for the iron and steel, rubber and many other lines. The January output of steel ingots and pig iron, just as the output of automobiles, made a new high record for this month of the year. Knowing what we do about the outlook for the automobile and other related industries, it is reasonable to forecast a continued high rate of business activity during the first half of 1929, unless some of the unfavorable factors that are now appearing become of sufficient importance to turn the tide in the opposite direction.

The building industry, which ranks next to the automobile industry, as a main support of active and prosperous conditions in this country, has recently been showing signs of weakness. It is an economic maxim that the building industry cannot thrive on high money. During the next few months, however, I do not anticipate any trouble from this source. A large volume of new construction already under way was carried over into the new year from 1928, and a large volume will undoubtedly be started during the spring months, in spite of the high money rates.

The other important factors that might adversely affect business this spring are money and speculation. The tremendous wave of speculative enthusiasm that has swept the country has resulted in such an expansion of brokers' loans as to raise the question whether a sufficient supply of credit will be available to finance the expected business expansion this spring. Recently, the Fed-

* Delivered at the convention of the Cost Association of the Paper Industry, Feb. 20, 1929, Waldorf-Astoria Hotel, New York.

eral Reserve authorities have issued a warning to member banks about lending their money on call. Every time they have expanded credit to help business, the stock market has grabbed it and they have experienced great difficulty in getting much of it back. Right now during the slack season they are trying to recover some of the credit they let out last fall, so that it will be available to finance the expansion of business this spring. If they succeed in squeezing some of the credit out of stocks, that will make money easier later on. But if they overdo it and force a major decline in stock prices, they will injure so many people financially that business will go into a tail spin and the credit obtained by liquidating brokers' loans will not be needed. So many business people are dabbling in stocks today that the operation of squeezing some credit out of the stock market without wrecking the whole works is certainly a most delicate one. The past record of the Federal Reserve authorities is not one to cause much alarm on this score. During the first half of last year they gave the stock market several taps on the wrist, with only temporary results, but they did not give it such a sock between the eyes as would permanently disable it, and drastic action at the present time is hardly to be expected. About the most they can accomplish is to stop the stock market from grabbing any more credit, until business has had a chance to get what it needs for the spring expansion at reasonable rates. If it should develop that money becomes too tight this spring, the Federal Reserve authorities will undoubtedly loosen up the purse strings and let out some more credit. It is estimated that credit inflation at the rate it has been expanding during the past year could continue several years yet before the supply in the Federal Reserve system would be entirely exhausted. There is not much danger then that drastic action to curb stock speculation will be taken or that a money stringency sufficient to hurt business will develop in the near future.

Business in general is on a sound basis. Neither inventories nor commodity prices are inflated. While business men in large numbers have become enthusiastic stock speculators, in the management of their business affairs they have remained decidedly conservative. Agricultural conditions also continue to show improvement. While the income from the principal crops harvested in 1928 fell a little below the 1927 income because of low price for wheat, the increase in livestock prices more than off-set this loss, making the total farm income somewhat greater than it was the year before. We therefore have at the beginning of 1929 a considerably increased buying power of factory labor when compared with a year ago, and a small increase in the farm income.

For the reasons above mentioned, therefore, I am definitely optimistic regarding the first half of 1929. For the second half year the outlook is not so good. It is quite probable that a sharp curtailment will occur in automobile production and that the building industry will show some slowing down in activity. If the agricultural crops are poor, we will almost certainly have a considerable recession in business, but if they are good, a fairly high rate of activity could be maintained until the end of the year. Bear in mind that the present recovery in business is now 14 months old. Beginning with 1923, every year except 1928 has experienced a recession of some sort. We may logically expect a repetition in 1929. It may be a mild affair, as in 1925 and 1926, or it may be somewhat severe, as in 1924 and 1927, depending upon future developments. If money and stock speculation were on as favorable a level as they were at the beginning of 1926, I would not hesitate to forecast that 1929 would be as good a year as that one was, but with stock speculation running rampant and with money rates so much higher, I feel that a more conservative forecast, especially for the second half year, is amply justified.

The paper industry experienced a good year in 1928 as far as volumes were concerned, but as regards prices and profits, the same cannot be said. Consumption was probably 5 per cent greater on the average than in 1927 for wrapping and book, while for paper board it was 6 or 7 per cent greater, and for newsprint and fine papers about 3.5 per cent greater. The actual production of newsprint in the United States, as was expected, declined some 70,000 tons, this difference being made good by the increase in imports. Owing to the decline in the production of newsprint and also in the production of building felts and roofing, total production of all grades showed an increase over 1927 of 2½ or 3 per cent.

With the business outlook as promising as it is for the first half of 1929, it is reasonable to forecast a continuation of large volumes in the paper industry at least until summer. I think that consumption during this period will run ahead of last year by about 5 per cent on the average. The volume of production, of course, will depend upon imports, exports and changes in inventories. In the case of newsprint it is quite certain that production will show a considerable decrease as it did during 1928, the difference being made up by increased imports from Canada.

For the second half of 1929 as favorable a forecast cannot be made as for the first half. I frankly do not expect consumption to show any material increase over the second half of 1928. When the automobile industry goes into a tail spin, as I anticipate it will next fall, the manufacturers usually curtail their advertising programmes radically. Furthermore, there will be no national election next fall requiring the use of paper for publicity purposes. Combining the first half year with the second half, the net gain in consumption for 1929 over 1928 will probably not average more than 2 or 3 per cent. But this increase on top of an increase of 4 or 5 per cent for the preceding year is certainly a good showing.

Although the paper industry will enjoy an expanding volume of business in 1929 as it did in 1928, it will probably continue to be classed as a depressed industry, because of low prices and vanishing profits. The troubles of the industry are not due to volumes but to uncontrolled production and unintelligent operation. In other words, the troubles are man-made and therefore can be man-cured. When the paper industry learns what the copper industry learned, namely, that production should be controlled and regulated to meet the market requirements, it will be prosperous, and not before.

At the present time in the paper industry too little attention is being given to market requirements, to finding out by careful investigation how much of a given grade a concern can manufacture and sell at a profit and where its logical and best markets are located. Too many mills are being run on the theory that the more tons they produce and sell, the more money they will make. I do not need to tell you cost men that there never was a greater economic fallacy. If such a policy is carried out to its logical conclusion, it will inevitably bring an industry to the point where every transaction is in red. The paper industry is rapidly approaching this point. Before any change for the better can be expected a spirit of co-operation must be substituted for the selfish individualism that now exists in many cases. There must be a willingness to work together for the common good. The facts necessary to formulate intelligent policies must be collected and disseminated and, most of all, these facts must be used. The salesmen and cost men must be given a greater voice in the management of their concerns than they have at present.

What has been done in the copper and rubber industries through co-operation and control can be done in the paper industry when its leaders realize that this is the only way out. The only question is how long will it take this simple truth to penetrate into their mental processes and produce action. Must we wait until conditions become so bad that bankruptcies are the regular order of the day, or will a constructive policy be adopted in time to prevent such disastrous results? The efforts of the newsprint manufacturers in Canada to stabilize their industry and the more recent efforts of the boxboard mills in this country to reinstate the so-called Washington agreement, which provides for 5 days of production, 1 day for clean up and repairs, and a complete Sunday closing, show that constructive efforts are already being undertaken in parts of the paper industry to improve conditions. If these efforts fail, it will be because the lessons of co-operation have not yet been learned.

Technical Association Papers and Reports

Presented at the Annual Convention of the Technical Association of the Pulp and Paper Industry at the Waldorf-Astoria, New York, February 19-21, 1929—Representative Men of the Pulp and Paper Industry Throughout the Country Discuss Numerous Important Problems of Timely Interest.

The Keebra Process*

By Linn Bradley[1] and Edward P. McKeefe[1]

The Keebra process for producing pulps from woods utilizes a digesting liquor containing sodium monosulphite as one of its main chemical constituents. The digesting liquor may or may not contain a regulated amount of one or more of the following chemicals, viz: sodium bisulphite, sodium sulphid, sodium hydroxide, sodium thiosulphate, sodium carbonate, sodium bicarbonate, sodium sulphate, sodium chloride. The latter two chemicals have but little if any influence on the digesting operation, although they may enter into the subject of operating costs at times. When the digesting liquor contains a chemical, other than sodium monosulphite, of such character and in sufficient amount that the action of the sodium monosulphite is substantially modified, it is convenient to refer to the process as a modified Keebra process to distinguish such modification from a process in which the effect of the sodium monosulphite is substantially unchanged. The acid Keebra, Thiokeebra, Sulphokeebra, Semikeebra and Carbokeebra processes represent some of the terms which have been applied to some of the modifications.

The acid Keebra process usually contains both sodium monosulphite and acid sodium sulphite, the variation from normal sulphite being regulated to suit the particular operations. The Thiokeebra process usually represents a digesting liquor which contains a preponderating amount of sodium monosulphite and a lesser but substantial amount of sodium thiosulphate. The Sulphokeebra process is the term sometimes applied to digesting liquors which contain a preponderating amount of sodium monosulphite and a lesser but substantial amount of sodium sulphide. The Semikeebra process is the name commonly used to designate the process in which the digesting liquor contains a larger amount of sodium hydroxide than of sodium sulphide and also contains a substantial amount of sodium sulphite. The Carbokeebra process as the term indicates, refers to the process in which the digesting liquor contains sodium monosulphite accompanied by a substantial amount of a carbonate of sodium.

Sulphites other than sulphites of sodium, for example potassium monosulphite, may be utilized in the digesting liquors. In some special cases, such other sulphites offer advantages which warrant their utilization in the digesting liquors. In this country and in Canada, however, it has been more feasible to employ sodium as the base on account of it being readily obtained.

Various woods of the coniferous and the deciduous types may be readily treated by any of these processes. Woods of the first type, when digested with liquors which contain little if any active digesting reagent other than a soluble monosulphite, may be progressively heated in contact with the liquor at a moderately slow rate until the particles of wood have become adequately impregnated with the liquor, after which they may be further heated at a faster rate, if desired, until a temperature has been reached at which the rate of digestion is adequate. Woods of the deciduous type, generally speaking, may be heated at a somewhat faster rate than coniferous woods. These two classes of woods possess such different properties as to call for a difference in the rate of heating in the initial stages. When coniferous woods are digested with the Sulphokeebra process or with the Semikeebra process liquors, the heating in the initial stages may be at a relatively rapid rate if desired. Apparently these two types of liquors are more rapid in penetrating the wood particles. Deciduous woods as a class are more readily penetrated by the digesting liquors than the coniferous woods. When the other types of digesting liquors described are heated at too rapid a rate in the initial stages, undesirable alterations of some of the non-fibrous constituents of the coniferous woods occur, thus rendering it quite difficult to digest a sufficient portion of the non-fibrous matter to produce chemical pulp of high quality by the use of such liquors alone. A subsequent treatment of the resulting fibrous material may be made by means of a strongly alkaline digesting liquor, however, so as to render soluble a sufficient portion of the altered non-fibrous matter to convert the material into chemical pulp of good quality. Wood chips may be subjected to a partial digesting treatment by means of the Keebra, Acid Keebra, Thiokeebra or Carbokeebra processes under mild conditions regulated so as to render soluble a major portion of the non-fibrous matter without dissolving an excessive amount of the cellulose, and the fibrous material may be thereafter subjected to a mild digesting treatment with a more alkaline liquor under conditions regulated to dissolve substantially all of the remaining non-fibrous organic matter. This multiple-stage digesting treatment may thus be employed in the production of pulps of special qualities.

The digesting liquors described above offer a wide range of cooking conditions which may be employed in the treatment of various woods. The multiple stage features referred to offer possibilities for varying the conditions of treatment to an even greater extent. It is thus possible to select the woods and the liquors and the methods of treatment so as to produce a great variety of pulps having their special properties.

A few examples of cooking or digesting liquors are given in Table I. The quantities are given in grams per liter.

TABLE 1

Reagents	Keebra	Acid Keebra	Thio Keebra	Sulfo Keebra	Semi Keebra	Carbo Keebra
Na_2SO_3	160	60	150	120	35	140
$NaHSO_3$	...	80	...	...	...	...
$Na_2S_2O_3$	...	...	15	...	...	5
Na_2S	...	...	...	40	10	...
NaOH	...	...	...	10	50	...
Na_2CO_3	...	...	...	5	8	10
$NaHCO_3$	...	...	...	...	...	5

* Presented at the Annual Meeting of TAPPI, February 20, 1929. (Printed but not published. All rights reserved by the Authors.)

[1] Bradley-McKeefe Corp., New York, N. Y.

These liquors may be diluted with such an amount of water as is required for proper charging and handling of the digesters during the digesting treatments, a suitable amount of active chemical being charged into the digesters in each case to effect the desired degree and rate of digesting, depending upon the amount and kind of wood charged into the digesters. With coniferous woods it is generally necessary to employ more active chemical per unit weight of wood (dry-basis) than with the usual run of deciduous woods. When the amount of non-fibrous organic matter to be rendered soluble is relatively high in the wood to be treated, a somewhat larger amount of active chemical can be employed. It is, of course, well known that some woods contain relatively large amounts of such matter.

Operating Procedure

The contents of the digesters may be heated by the direct introduction of steam, or by the indirect method of heating, or in part by each of these methods of heating. When Aspen Wood is the material employed, the heating of the liquor in the digester may be carried out so as to reach a temperature of around 170 to 185 deg. C. in about 1½ to 2 hours. It is desirable to obtain a fairly uniform distribution of liquor and heat throughout the digester contents during the digesting operation. The digester contents may be maintained at around 170 to 185 deg. C., more or less, until the desired degree of digestion has been obtained. With the lower temperatures a somewhat longer time is required than with the higher temperatures. Aspen may be digested so as to produce chemical pulp of high quality and of easy bleaching properties and in relatively high yields within about 3 to 6 hours after reaching the active digesting temperature. An excessively high temperature is capable of producing pulp in less time, but there is a greater possibility of injuring the yield of pulp.

Cooking Spruce

When spruce chips, for example, are digested by one of the milder cooking liquors described, it has been found advisable in practice to raise the temperature rather slowly in the initial stages, so as to insure adequate impregnation of the chips with the digesting liquor before reaching such a temperature as causes non-fibrous organic matter of the chips to become objectionably altered as pointed out in a preceding paragraph. By regulating the rate of heating so that the temperature of the digesting liquor is brought up to around 180 to 190 deg. C. in about 3 to 4 hours, and at a gradual rate of increase, and by maintaining the temperature of the digesting liquor at around this temperature for a period of 6 to 10 hours or more, depending upon the conditions, chemical pulp of excellent quality and in good yields can be produced. The conditions described for the treatment of Spruce are generally applicable to the conifers. Temperatures somewhat higher than 190 deg. C. can be reached, thus rendering the digesting liquor somewhat more active. When temperatures much below 180 deg. C. are maintained during the major portion of the time, the digesting period must be lengthened to obtain chemical pulp of the same bleachability. Temperatures between 170 and 190 deg. C. have been found desirable when producing chemical pulps from woods by means of either the Keebra, Thiokeebra or Carbokeebra processes. While temperatures either above or below these figures can be employed during the main portion of the heating period, these temperatures are sufficiently high to permit of pulping the woods in a reasonable period of time and are below those at which an excessive amount of cellulose is destroyed. The acid Keebra, Sulphokeebra and Semikeebra processes are, in general, more active than the other processes described, that is to say, the digesting liquors are sufficiently more active than those of these other processes as to permit of their being employed at lower temperatures, when desired, or to complete the digesting stage in less time when the higher temperatures are utilized.

Cooking Liquors

The cooking liquors for these various digesting treatments may be readily prepared. A solution of sodium sulphite or sodium acid sulphite or a regulated mixture of sodium monosulphite and sodium bisulphite, can be prepared by burning sulphur to form sulphur dioxide and by passing this into a solution of sodium carbonate until the desired content of sulphur dioxide has been obtained. A modification comprises the preparation of a solution of sodium acid sulphite and the subsequent treatment of a solution containing sodium carbonate by means of such acid solution. In the latter method it is possible to produce carbon dioxide gas in a relatively concentrated state. Instead of starting with sodium carbonate, a solution of sodium hydroxide can serve as the absorbing solution. Owing to the difference in costs, the carbonate will ordinarily be the preferred form. When neither of these two standard chemicals is readily available at a sufficiently low cost, it is possible to resort to methods applicable to the treatment of sodium sulphate or sodium bisulphate or other suitable sodium compounds, whereby a sulphite of sodium can be produced at a reasonable expense. The selection of the sodium compound or compounds to be converted into a sulphite of sodium will depend upon the various conditions which obtain at a particular location. Hence it is desirable to fit the methods to the material or materials most readily available at a plant. In the preparation of digesting liquors which contain both sodium sulphite and sodium hydroxide, it has been found convenient to sulphite one lot of sodium carbonate, causticize another portion of sodium carbonate by means of lime, and thus obtain the desired ratio of ingredients in the resulting liquor. Sodium thiosulphate can be readily prepared by dissolving sulphur dioxide in a solution which contains sodium sulphide.

The residual liquors from the digesting operations may be treated to remove the water and the dry residue may be heated to decompose the organic matter and the soda content regained. Some of the residual liquors have properties which render them suitable for utilization in the tanning industry or in the preparation of liquors for such industry. This is particularly true when the digesting liquor is made up almost entirely from an aqueous solution of sodium monosulphite and deciduous woods with a substantial amount of natural tanning substances are digested therewith. Such residual liquors as are produced in digesting woods carrying little if any natural tanning substances, employing essentially a solution of sodium monosulphite, are applicable to various other special purposes.

Recovery

When the dry sodium organic and accompanying materials, after removal of the water from the residual liquors described, are subjected to a furnacing treatment under reducing conditions, the soda is regained as a mixture containing sodium carbonate and sodium sulphide, although other constituents may also be present, the amounts and kinds of the latter varying with the conditions of the residual liquor and of the subsequent treatment. The ratio of sodium carbonate to sodium sulphide depends to some extent upon the ratio of total sulphur to total soda in the residual liquor. The ratio of soda and sulphur to the organic matter in the residual liquor also exerts an influence. The recovered soda from the residual liquors in commercial practice usually contains more sodium carbonate than sodium sulphide, some of the sulphur content of the residual liquor having been carried off with the hot gases from the furnace. The soda recovered from the residual liquors which have the relatively small amounts of sulphur, generally consists largely of sodium carbonate.

The recovered soda may, if desired, be utilized in the preparation of cooking liquor for a subsequent digesting treatment. The operations may thus be made cyclic in character, a sufficient amount of suitable chemicals being supplied to the cycle to replenish those lost in the operations. The same type of digesting operations may follow each other in the cycle, or two or more different types of digesting liquors may be formed. When the recovered soda contains a relatively large amount of sodium sulphide, there is an advantage in conducting two or more digesting treatments of different types. For illustration, the residual liquor from a digesting treatment with the Keebra, Acid Keebra, Thiokeebra or Sulphokeebra, cooking liquors, may be subjected to recovery operations which recover the soda largely as sodium carbonate and

sodium sulphide, the former reagent being readily obtained in preponderating amount. This recovered soda may be dissolved to form a solution and the latter treated by means of lime to produce a cooking liquor containing sodium hydroxide and a substantial but lesser amount of sodium sulphide. A moderate amount of sodium monosulphite may be included in the digesting operation utilizing the sodium hydroxide and the sodium sulphide, or such digesting operation can be carried out with the regenerated cooking liquor with little or no sodium sulphite present therein, depending upon the results desired. The residual liquor resulting from the digesting treatment with this relatively strong alkaline liquor, may be treated to remove the water, destroy the organic matter and to regain the soda largely as sodium carbonate. A solution of this regained soda may be subjected to a sulphiting operation under conditions so regulated as to convert the regained soda largely into sodium monosulphite or sodium acid sulphite or into a mixture thereof.

Aspen Pulp

When Aspen chips are digested by means of a cooking liquor consisting of a solution of sodium thiosulphate in adequate amount and under suitable time and temperature conditions, a dark fibrous material is obtainable. Such dark material offers some attractive possibilities in the production of certain special papers, but owing to difficulty in bleaching such pulp to a good white, there is but limited field for such a product. Such chips may, however, be converted into easy-bleaching pulp by digestion with a cooking liquor containing sodium thiosulphate, provided the amount of sodium thiosulphate is not too large and there is a sufficient amount of sodium monosulphite present in the cooking liquor. It is thus possible to employ digesting liquors which contain substantial amounts of sodium thiosulphate when sufficient amounts of sodium monosulphite are also present. The residual liquor from the digesting operation, when sodium thiosulphate is present in substantial amount and sodium monosulphite is the preponderating reagent, may carry a higher total sulphur in proportion to organic matter than when such thiosulphate is absent or is present in only small amount. Accordingly, when such residual liquor is treated to remove water and to decompose the organic matter in a furnace, the regained soda may contain a relatively large amount of sodium sulphide. When the recovered soda is to be dissolved and the sodium carbonate causticized, such relatively large content of sodium sulphide is often an advantage in the subsequent digesting treatment. Inasmuch as it is easily possible to convert sodium sulphide into sodium thiosulphate by introducing sulphur dioxide into a solution containing sodium sulphide, the regeneration treatment should be regulated so as to control the production of sodium sulphite and to obviate the production of excessive amounts of thiosulphate.

A solution of the regained soda which contains a relatively large amount of sodium sulphide, may be treated to remove a sulphide therefrom, either as a volatile compound or as an insoluble compound, and the treated liquor may be subjected to a sulphiting treatment to produce a sulphite of sodium therein. Another method for treating such a solution of the regained soda is to convert the sodium carbonate content thereof into sodium sulphite to the desired extent without disturbing the sodium sulphide to any great degree. The latter plan permits of the production of regenerated cooking liquors which contain mostly sodium monosulphite and sodium sulphide, although sodium hydroxide, sodium carbonate and other constituents may be present therein in moderate to small amounts. It will be observed that such a regenerated cooking liquor is embraced in the term Sulphokeebra referred to in an earlier portion of this paper.

Various cycles of operation may be selected for the series of digesting operations and for treatment of residual liquors, thus enabling each particular mill to adapt the processes to its particular requirements as to woods available for pulping, chemicals available for production of the cooking liquors, kinds and qualities of pulps and papers to be marketed. These processes are applicable to mills producing news print, book paper, magazine paper, writing paper, wrapping paper, envelope paper, boards of various kinds, and a great variety of woods can be utilized to advantage. Soft pulps as well as hard pulps, easy bleaching as well as pulps which are bleachable with difficulties, can be produced. Pulps of light color and of great strength and durability can be obtained from various woods. Unbleached pulps obtained by those processes which have but little or no sodium hydroxide in the cooking liquors are characterized by their high strength, light color and their durability. These pulps are adapted to the production of special papers in which these qualities are very desirable.

Pulps From Other Woods

The short fibered woods, such as birch, beech, maple, cottonwood, gum, etc., yield pulps of sufficient strength to permit of their use in place of sulphite pulp from spruce, for various papers. Such pulps may be admixed with ground wood or mechanical pulp in the production of news print, thereby eliminating the sulphite pulp customarily incorporated in the furnish of the paper mill which produces news print. These pulps, after bleaching, are also well adapted to the producing of writing papers having excellent appearance, writing qualities and durability. Admixtures of pulps obtained from spruce, balsam, pine, tamarack, etc., with the pulps the hardwoods mentioned, have found considerable demand in the production of writing papers. Admixtures of hardwood pulps produced in part by the Semikeebra process and in part by the Keebra process have been utilized in the production of various kinds of book paper and magazine paper. Such papers are characterized by their uniformity of texture, opacity, strength, durability, printing qualities and appearance. Pulps obtained by one or more of these processes from jack pine, tamarack and spruce have been utilized in the production of light colored papers for such uses as wrapping, envelopes, and specialties. Various kinds of papers and paper products can be made from pulps produced by heating wood particles with such cooking liquors so as to soften the wood particles and by treatment of the softened wood particles by mechanical means so as to produce a pulpy material containing fibres and undissolved non fibrous organic material.

Mills Using Process

Processes described above have been operated at various plants both in the United States and in Canada, producing many thousands of tons of pulps from both coniferous woods and deciduous woods. In the United States, the first mill to commercially operate such a process was that of the Ticonderoga Pulp and Paper Company at Ticonderoga, New York. The Northwest Paper Company, at Cloquet, Minnesota, has produced large amounts of pulps from jack pine, tamarack, aspen and birch, and utilized these pulps in the production of a variety of papers. The Canada Paper Company, of Windsor Mills, Quebec, has produced a considerable tonnage of pulps and papers by means of some of these processes. The first mill in Canada to utilize the Keebra pulp made from hardwoods in admixture with groundwood for the production of newsprint papers of various kinds, in lieu of spruce sulfite, was that of the Laurentide Company at Grand Mere, Quebec. The pulp for the latter operation was produced in their small digester. No provision was made for recovering the soda from the residual liquor in this operation.

It is an interesting coincidence that at about the same time that the authors were developing the Keebra process, Dr. Viggo Drewsen, the well known pulp and paper research chemist, of the West Virginia Pulp and Paper Company, was engaged in an independent investigation of the use of sodium monosulphite solution as a pulping agent for wood. An article published by Dr. Drewsen, several months ago, indicates that he likewise considers that chemical pulps produced from woods by the sodium monosulphite digesting process have exceptional merit.

The authors expect to prepare separate papers, describing in more detail various phases of these processes, particularly some of the modification described, and to elaborate somewhat upon various methods which they have developed for reproducing and utilizing cooking liquors containing the regained soda.

Mechanism of Drying of Pulp and Paper*

By T. K. Sherwood [1]

Three very different processes have been proposed or are in use for the drying of pulp and paper products. The first of these is the common steam-heated drum or "can" drier, in which the sheet of pulp or paper is heated by contact with rotating hollow drums filled with steam, air being used as a carrier gas to remove the water vapor formed. The second type is the enclosed drier, operating at approximately atmospheric pressure, the water in the sheet being literally boiled out, and no air being necessary to remove the water vapor. The third type is the vacuum drier, similar to the second type, but operating under a high vacuum so that the water in the sheet is boiled out at a relatively low temperature, the only air present being that coming in through leaks in the housing or entrained in the sheet. At present the first type is by far the most common, and it is proposed to limit this paper to a discussion of the mechanism of drying obtaining in driers of this type. Since air is used as a carrier gas to remove the water vapor formed, the process is fundamentally similar to ordinary air drying or loft drying. Heat is supplied by contact with the hot drums instead of by convection from the surrounding air, and the process is complicated by the alternate heating and cooling of the sheet as it passes over the driers, but much can be learned of the mechanism of drying on a drum drier by a study of the air drying of similar materials.

General Mechanism of Drying

All very wet solids being dried under constant drying conditions exhibit a "constant rate period," during which the rate of drying is constant. The rate does not continue constant until the solid is dry, but at some definite water content called the "critical water content" the rate of drying starts to decrease and the range from there to dryness is called the "falling rate period." Obviously, if the initial water content is less than the critical, no constant rate period appears. During the constant rate period the solid temperature remains constant, and the rate of diffusion of water vapor through the surface air film controls the drying. When the heat necessary for vaporization is supplied only by conduction through the same surface gas film through which the vapor diffuses, the surface temperature during this period is the wet-bulb temperature of the air. When heat is supplied in other ways, such as by radiation or by contact with the hot surface of the drum driers, the surface temperature is higher than the wet-bulb, and the rate of drying is increased. In case the very wet sheet is initially at some temperature other than the equilibrium temperature prevailing during the constant rate period, an initial adjustment period occurs, during which the sheet is warmed or cooled to that equilibrium temperature. In the commercial drier, the sheet is initially colder than the equilibrium temperature prevailing during the constant rate period, and in passing over the first few driers the sheet temperature rises, as does the drying rate.

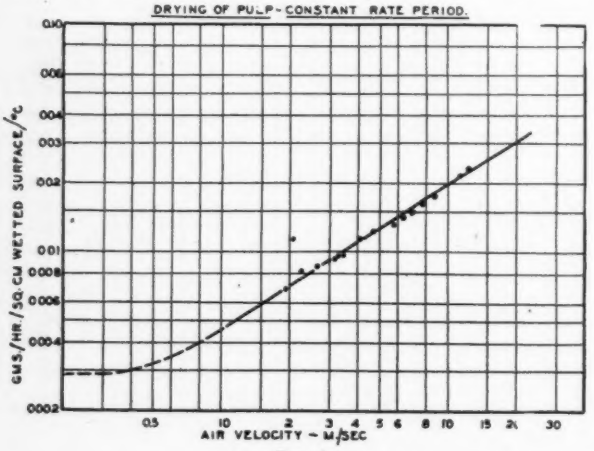


FIG. 1

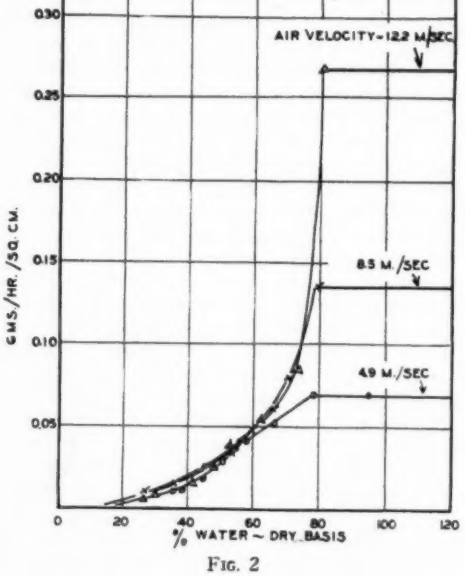


FIG. 2

As stated above, the rate of drying during the constant rate period is controlled by the rate of vapor diffusion through the surface air film, which in turn is inversely proportional to the air film thickness, and directly proportional to the driving force, which may be expressed as the difference between the vapor pressure of water at the temperature of the sheet and the partial pressure of water vapor in the surrounding air. Thus factors which tend to decrease the effective air film thickness, or increase the driving force causing diffusion, may be expected to speed up the rate of drying during the constant rate period.

The Air Film Thickness

An important variable influencing the air film thickness is the air velocity past the solid surface, and its influence on the rate of drying is illustrated by the data shown plotted in Fig. 1. This plot shows the data obtained in experiments in which a very wet block of pressed pulp (5.0 x 5.2 x 1.52 cm.) was dried in a small flue through which air was forced by a blower. Frequent weighings were made and the rate of drying at the instant when the pulp contained 100 per cent water was calculated. Since the edges of the block were covered with a cement, and the block was placed longitudinally in the flue, the actual drying took place from faces parallel to the direction of air flow. The air velocity was

* Taken in part from a thesis entitled "The Mechanism of the Drying of Solids," submitted in partial fulfillment of the requirements for the degree of Doctor of Science from the Massachusetts Institute of Technology, Department of Chemical Engineering, 1928. Presented before Annual Meeting of TAPPI, Feb. 19, 1929.

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changed from run to run, and measured in each case by an anemometer in the flue. The wet-bulb and dry-bulb temperatures of the air were recorded, and the rate of drying calculated as gms. per hour per sq. cm. wetted surface per degree C. wet-bulb depression. Fig. 1 shows the rates so calculated plotted vs. air velocity in meters per second, on logarithmic paper. At moderate and high air velocities the rate of drying is seen to be proportional to approximately the 0.6 power of the air velocity, and at the lower end the curve approaches an asymptote corresponding to the rate of vaporization under conditions of natural air convecton.

In the drying of many solids the falling rate period is found to be divisible into two distinct zones. The first of these follows immediately after the constant rate period, and is frequently characterized by a linear relation between the rate of drying and the water content. In this zone evaporation occurs at the surface of the solid, the decrease in the rate of drying being due to the decrease in the surface actually wetted, and the mechanism in this region may be called "unsaturated surface drying". In the second zone the rate of vaporization falls off sharply; the rate of diffusion of liquid water to the solid surface controls the drying, and the drying rate at any water content is inversely proportional to the slab thickness. Depending on the material and the drying conditions, the zone of unsaturated surface drying may or may not appear. The rate of internal liquid diffusion and consequently the rate of drying in the second zone is independent of outside conditions; and if the average water content falls to that value where the rate of internal liquid diffusion is equal to the rate of drying in the constant rate period, before the surface liquid concentration falls to such a value as to cause the wetted surface area to decrease, then no zone of unsaturated surface drying appears. Thus in drying a 0.82 cm. block of pressed pulp Tu[2] found that at high air velocities, no such zone appeared. Therefore in this case internal liquid diffusion is controlling throughout the falling rate period, and variations in air velocity might be expected to have no effect on the rate of drying in this region. That such is the case is shown by Fig. 2, representing data obtained by Tu, and showing that at water contents below the

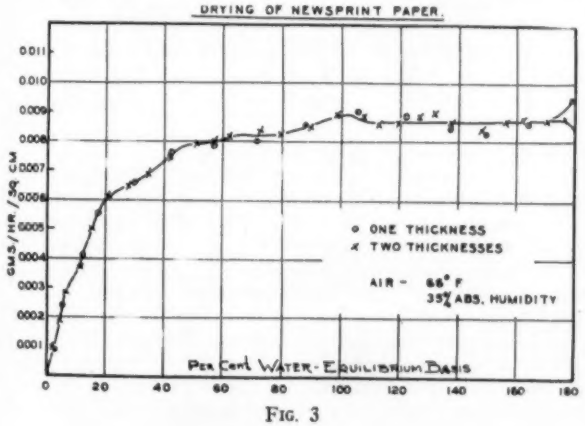

FIG. 3

critical of about 80 per cent, variations in air velocity from 4.9 to 12.2 meters per second had little effect on the drying rate.

Air Velocity

Since air velocity has an important effect on the rate of drying in the constant rate period and in the zone of unsaturated surface drying, and little or no effect on the rate in the zone where internal liquid diffusion is controlling, it is important to know the mechanism of drying during the falling rate period in the drying of a given material. Since the rate of diffusion of liquid to the surface is inversely proportional to the sheet thickness, it might be expected that in drying such thin sheets as newsprint, internal liquid diffusion would control the drying only at extremely low water concentrations, and that the mechanism of drying during nearly the whole of the falling rate period would be that of unsaturated surface drying. That such is actually the case is indicated by data obtained on the drying of newsprint, shown plotted in Fig. 3. Two samples approximately 9 cm. square were dried under exactly the same conditions of air temperature and humidity, one a single thickness, and the other consisting of

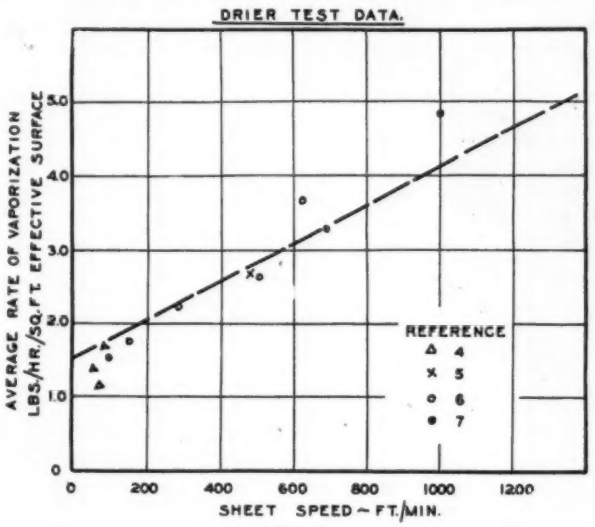

FIG. 4

two thicknesses sewn together. The two samples were dried at the same time while suspended from the arms of two chemical balances in air at 66.0 deg. F., and having an absolute humidity of 35 per cent. Frequent weighings of each sample were made and the rate of drying calculated from the loss in weight and the time between successive weighings. The rates so calculated as gms. per hour per sq. cm. are shown plotted in Fig. 3 vs. the free water content of the sample, expressed as a percent of the final (equlibrium) weight. Slight fluctuation from a constant rate is noted at high water contents, partly due to the fact that the weighings in this region were necessarily more frequent than when the rate of drying was low, and the error in the short interval of time measured was relatively large. However, the coincidence of the curves for the two samples is striking, and the conclusion is obvious that the rate of drying is independent of sheet thickness for such thin sheets, over the large part of the drying range. It follows, therefore, that internal liquid diffusion is at no point controlling, except possibly over a negligibly small range at very low water contents. The mechanism of drying over nearly the whole of the falling rate period is therefore that of unsaturated surface drying, and is consequently influenced by such factors as air velocity and air humidity, which no not affect the rate of drying when internal liquid diffusion is controlling.

Drying of Pulp and Paper on Drum Driers

In the analysis of data on the drying of pulp or paper on commercial driers, factors under the control of the designer or operator should be divided into those influencing the capacity of the drier, and those influencing the heat economy. The capacity of the machine is of importance primarily because of its relation to the fixed charges on the drying equipment, and the heat economy because of its relation to the steam costs. Leaky steam traps influence the heat economy but not the capacity; air in the driers influences the rate of heat flow and consequently the capacity, but does not greatly affect the steam economy.

As pointed out above, the temperature of the sheet on the drier is maintained much higher than the wet-bulb temperature of the

[2] C. M. Tu, M. I. T. Chem. Eng. Thesis, 1928.

air, due to the fact that the heat necessary for vaporization as transferred not simply by convection through the surface air film, but by contact with the hot surface of the drier. As the sheet temperature is increased the rate of vaporization increases, but the rate of heat flow to the sheet decreases due to the decreased temperature difference between steam and sheet; an equilibrium temperature is reached at which the rate of heat flow to the sheet is equal to the latent heat required at the rate of vaporization maintained. If the resistance to heat flow to the sheet is low, or if the resistance to vapor removal from the surface of the sheet is small, the rate of drying and consequently the capacity of the drier relatively great. Factors affecting the capacity of the machine may therefore be divided into those affecting the resistance of heat flow from steam to sheet, and those affecting the resistance of removal of vapor from the sheet surface.

The rate of removal of water vapor from the surface of the sheet is governed by the rate of diffusion through the surface air film, which is proportional to the difference between the vapor pressure of water at the temperature of the sheet and the partial pressure of water in the surrounding air; it is also proportional to the wetted area of the sheet, and inversely proportional to the effective thickness of the air film on the surface. The wetted surface area is a function of the water content, and is not capable of being varied. The partial pressure difference, which is the driving force causing vapor diffusion, may be increased by decreasing the average humidity of the air, or by maintaining the sheet at a high temperature. The effective thickness of the air film on the surface is primarily a function of the air velocity, which consequently has an important influence on the rate of drying, as was shown by the data of Fig. 1.

In the case of the commercial pulp or paper drier, there are possibilities of greatly improving the machine capacity by the proper use of air jets directed at the surface of the sheet. The use of such forced air convection would not necessarily be the cause of a poorer heat economy, since air leaving the drier housing could be recirculated for this purpose. However, it would be important to see that no air was blown across the bare surfaces of the driers, as this would increase the heating of the air, and probably decrease the heat economy. Ordinarily, however, a high relative air velocity is maintained by using a high sheet speed, rather than by the use of forced air convection, and it is of interest to note the effect of sheet speed on the average drying rate, as indicated by various published tests on paper driers. The overall average rate of drying obtained in a number of such tests[3, 4, 5] has been calculated as pounds per hour per square foot effective drier surface, and are shown plotted in Fig. 4 against the lineal sheet speed, as feet per minute. The points are seen to fall on a fairly smooth curve, and the rapid increase in the drying rate with increase in sheet speed is apparent. However, it should be pointed out that plotting in this way does not allow for the influence of other factors such as steam temperature and final water content on the average rate of drying. Since the rate of drying at low water contents is only a fraction of that during the constant rate period, the overall average rate of drying will vary with the final water content under similar conditions of sheet speed and steam temperature. The points at the three highest sheet speeds represent tests where not only the steam temperature but the water contents of the product were relatively high, and it is therefore believed that the actual relation between average drying rate and sheet speed on paper driers is represented by a line of somewhat lower slope than the best line through the points on Fig. 4. The relation is probably somewhere near that represented by the dotted line shown, although the average rate will vary somewhat with steam temperature, and with final water content. The effect of air velocity or sheet speed as indicated by this curve is not as great as that found in the case of the wet pulp block shown in Fig. 1, since the temperature of the sheet on the drum drier does not remain constant as the speed is varied. As the surface resistance to vapor diffusion is decreased with an increase in sheet speed, the sheet cools, thus decreasing the vapor pressure of water at the sheet surface. Thus the increase in drying rate due to the decrease in surface resistance to vapor diffusion (as shown in Fig. 1) is partially offset by the accompanying decrease in sheet temperature. The importance of the relation brought out by Fig. 4 is best illustrated by an example. Suppose it is desired to double the capacity of a machine by increasing the sheet speed from 300 to 600 ft. per minute. Reference to Fig. 4 shows that the average drying rate will be increased from about 2.3 to 3.1 pounds per hr. per sq. ft.; it will therefore be necessary to increase the number of driers by only

$$\frac{2 \times 2.3}{3.1} \times 100 - 100 = 48 \text{ per cent}$$

The effect of air velocity is further brought out by the results of a test[6] on a pulp drier fitted with dryjectors extending over the width of the sheet over the center of three-quarters of the driers. The air velocity leaving the dryjectors was not great, but its effect is apparent from the location of the point on Fig. 4 for this test, which is represented by the dot shown at a sheet speed of 72 ft. per minute.

It is important not only to maintain a low resistance to vapor removal from the sheet surface, but to have the resistance to heat flow from steam to sheet as low as possible. The heat flows in series through the separate thermal resistances of steam film and metal wall. A decrease in the overall resistance to heat flow makes possible a higher rate of heat flow with a lower temperature difference, and with a fixed steam temperature the sheet temperature and consequently the rate of drying will be increased. The steam film resistance is greatly influenced by rusting of the inside surface of the drier, by oil entrained in the steam when exhaust steam is used, by poor removal of condensate, and especially by the presence of air in the drier. Perhaps the best method of maintaining the steam free of air is to fit each drier with a small petcock which is cracked slightly all the time. An added thermal resistance found at the dry end of pulp driers is the thin layer of pulp fibers which accumulates on the surface of the driers unless continually scraped off. Attention to the several factors mentioned above as influencing the overall resistance to heat flow from steam to sheet may frequently appreciably increase the capacity of a given machine.

Probably the most important factors affecting the steam consumption of the drier are the initial and final moisture content, the initial temperature of the wet sheet, the amount of air used, and the efficiency of the steam traps. The effect of the initial and final water contents is obvious; the effect of the amount of air used is more involved. In nine tests on paper machines[3, 4, 5], the heat required to heat the air used from the room temperature to the exhaust temperatures varied from 134 to 394, and averaged 276 B.t.u. per pound of water evaporated. However, the drier should be charged with the heat required to heat this air, not only from the room temperature, but from the outside temperature to the exhaust temperature. The outside temperatures were not reported, but assuming them to be 50 deg. F. in each case (the tests were run between November and March), the calculated heat required to heat the air used from 50 deg. F. to the room temperature averaged 437 B.t.u. per pound water evaporated. The total heat requirements in these tests therefore averaged about 1100 plus 700 or about 1800 B.t.u. per pound water evaporated and the heat used in heating the air was on the average nearly 40 percent of the total. The cost of heating the air is by no means proportional to the amount used, since when large amounts of air are used the exhaust temperature is much lower. With large amounts of air the steam consumption is increased, but the advantage is obtained that the average humidity over the sheet is lowered, with consequent increase in drier capacity.

[3] Technical Assoc. Papers, Series V (1922), p. 32.
[4] Technical Assoc. Papers, Series VI (1923), p. 112.
[5] Technical Assoc. Papers, Series VII (1924), p. 182.

[6] Lewis, McAdams and Adams, Pulp and Paper Mag. Can., Jan., 1927.

Paper Mill Steam Plants Keep Up With the Times*

By Martin Frisch and F. W. Heller[1]

Central stations are seldom backward in exploiting the developments which disclose possibilities of reducing the cost of making steam. They have adopted most of the promising developments and improvements in boiler room equipment, especially fuel burning equipment, and these have led to cheaper steam and to cheaper power. The same developments and the same opportunities for saving money in the manufacture of steam were available to industrial plants and the paper manufacturers have not been backward in adopting them.

Trend of Development

The general trend of the development work has been to decrease first investment costs per pound of steam production by increasing boiler and furnace capacities and to increase economy by designing such equipment to be efficient at these high capacities. Reliability is secured by designs which are simple to operate, have high use factor, great freedom from breakdown possibilities and infrequent and inexpensive maintenance requirements.

Experience indicates that the cheapest boiler plant does not always turn out the cheapest steam, nor does the one that uses the least heat units always do so. Good plant design calls for reliability first, and for economy second.

A given reliability has a certain minimum price, irrespective of the efficiency that can be built into the plant for that price. A higher efficiency is justifiable if the additional investment required pays its own way by bringing about economies which yield a satisfactory return. If fuel costs are high, as they generally are at inaccessible paper mills, efficiency is important, for the fuel consumption of a paper mill is roughly a ton of coal per ton of paper. It is now an established fact that if proper provisions are made to insure the dryness of steam, a given boiler's steaming capacity depends on the amount of flue gas that may be put through it. Rates of evaporation of twenty to thirty pounds per hour per square foot of heating surface as compared with the 3.5 to 7 pound rates customary before, are now being realized daily in industrial as well as utility plants under conditions most exacting as to reliability and economy. The result is that a given boiler is good for more steam. Less boiler surface, fewer boilers and smaller boiler plants now satisfy a given steam demand. The investment in boilers, i.e., the first cost per developed boiler horsepower, is therefore lower. Money so saved is generally invested in efficiency increasing auxiliaries and, in general, such marginal investments yield handsome returns on account of the savings they produce. Many paper mill engineers have found this out, and many paper mill steam plants now operate at high capacity both efficiently and economically.

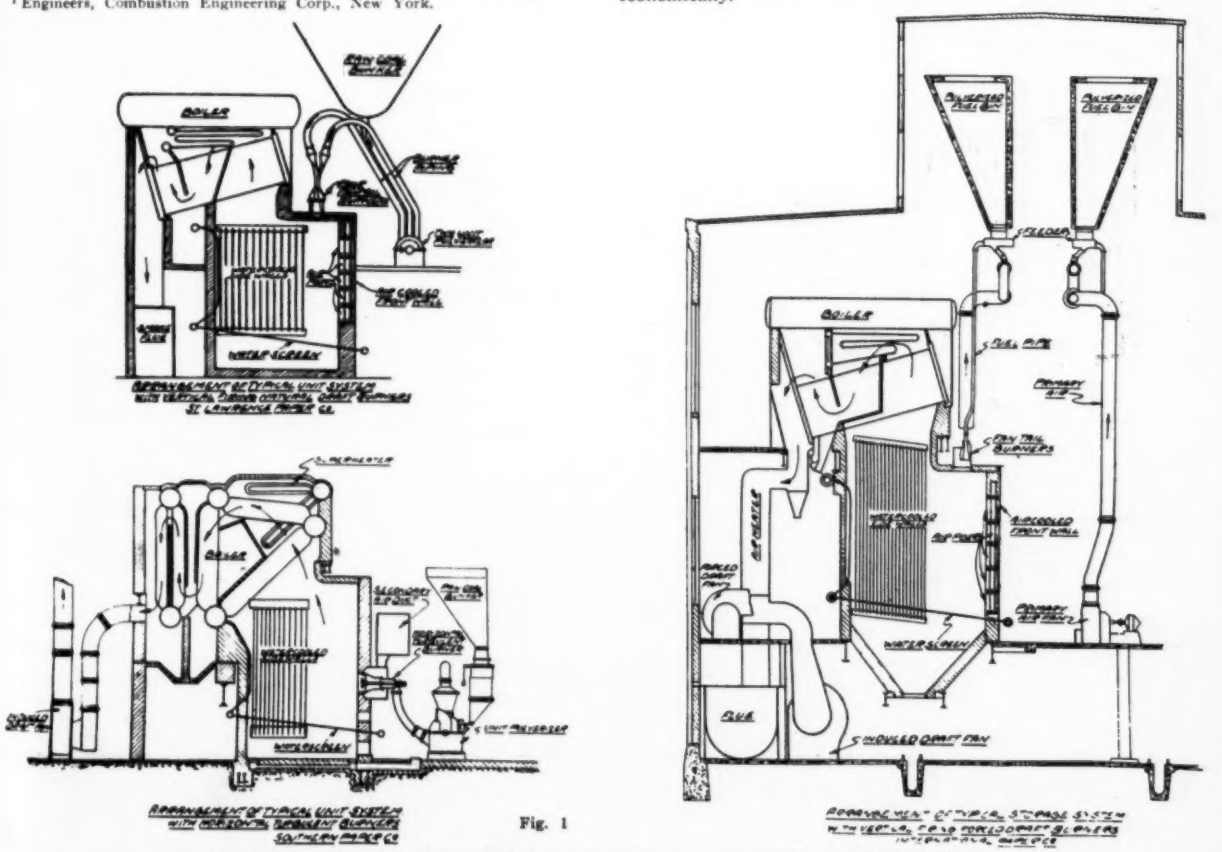

Fig. 1

Typical Pulverized Coal Fired Boiler Units As Installed in Representative Paper Mill Boiler Plants.

* Presented at Annual Meeting of TAPPI, New York, Feb. 19, 1929.
[1] Engineers, Combustion Engineering Corp., New York.

Plants Free to "Shop Around" for Fuel Have Advantage

Boiler plants which can burn with minimum trouble large varieties of fuels, especially low grade coals, and which can be readily and quickly adapted to other fuels such as oil or gas when market conditions warrant have an advantage in the bargaining power this versatility gives them when purchasing fuel. Nor is the insurance value of this versatility unimportant for it renders a plant independent of disturbances in the supply of its customary fuel. Uninterrupted production and true economy often depend on this.

Pulverized Coal Plants Serve Paper Industry Well

Pulverized coal fired boiler plants, of which perhaps more are to be found in the paper industry than in any other industry (public utilities excepted), are unique in their built-in-ability to burn all grades of bituminous coals. Such plants may be readily adapted to burn gas or oil when the market warrants, and several paper mills switch from coal to oil whenever the fuel market warrants. Such plants are easy to operate because it is simple to vary the combustion and steaming rates and they are efficient because the fuel and air proportions and completeness of mixing of air and fuel may be controlled with ease. Operating efficiencies over long periods closely approach test efficiencies.

Banking losses are negligible. The "serviceability" of such plants is high because boiler outages traceable to the failure of

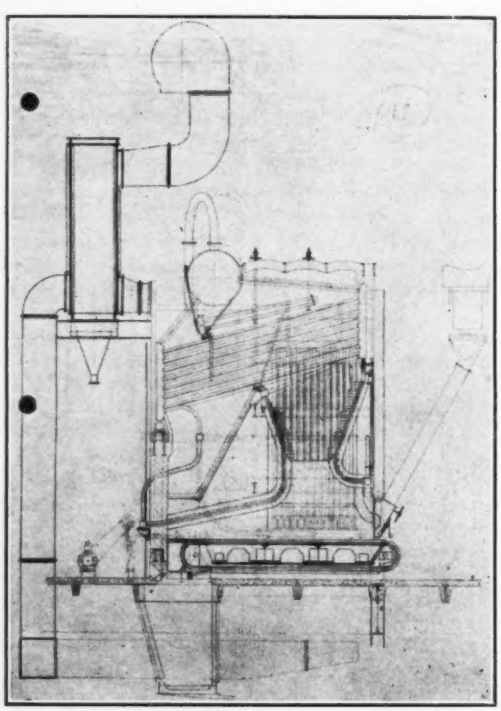

FIG. 2

Typical Forced Draft Traveling Grate Stoker for Burning Coke Breeze. (Note the Watercooled Furnace—Rear Arch).

fuel burning equipment are infrequent. This favors the attainment of high economic efficiencies from plants of conservative and unextravagant design. For certain load conditions and plant sizes the storage system of burning pulverized coal offers a means for firing boilers, which for reliability and flexibility is unexcelled. This is of special importance in paper mills where sudden and large fluctuations in steam demand may arise when a digester or some other steam heated apparatus is shut off or put into service. For other load conditions the unit system may prove more economical. Both are extensively used in the paper industry. Either of these systems may be so worked out that gas or oil may be burned alone or in combination with the pulverized coal with but minor modifications to the furnace. Fig. 1 shows typical pulverized coal fired boiler furnaces of both the storage and the unit systems, as installed in representative paper plants.

Better Stokers Are Now Also Used

The successful development of powdered coal firing for boilers has forced marked improvements in stokers; also in other furnace

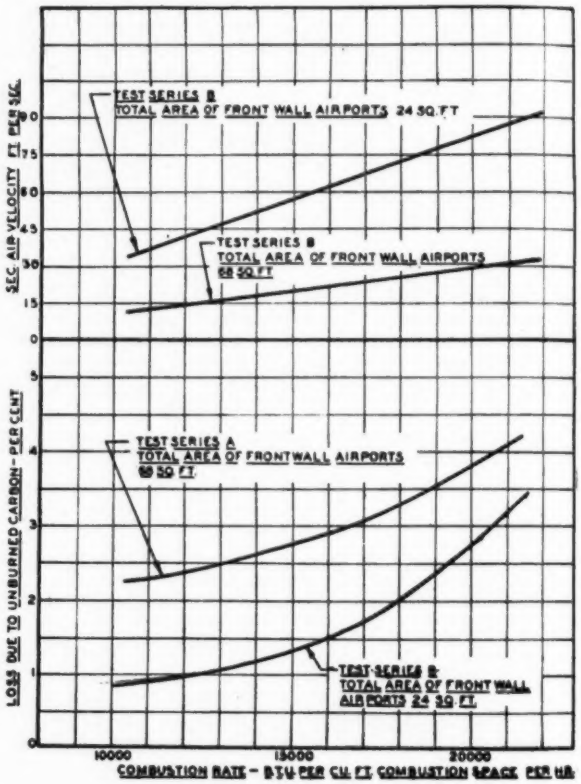

FIG. 3

Curves Showing Actual Reduction in Loss Due to Unburned Carbon Brought About by Increased Turbulence from Introduction of Secondary Air at Higher Velocities.

equipment and even in boilers. The first users of powdered coal soon became aware of the fact that more coal could be burned in powdered form per unit of boiler cross section than was thought possible with stokers. For, does not the boiler length and width fix the maximum grate area that may be installed and hence the capacity of the stoker? The powdered coal fired boiler is not so limited because if the boiler limits the furnace length and width the boiler may be set higher and the furnace volume made as large as desired. This is important, for the fuel burning capacity of a powdered coal furnace depends on the furnace volume—not on the cross section as with stokers. Hence, although at first powdered coal combustion rates per cubic foot of furnace volume were lower than those customary in stoker furnaces, the aggregate fuel burning capacities of pulverized coal furnaces were increased beyond the limits usually thought attainable or practicable with a given boiler by the simple expedient of increasing the depth of the furnace and the length of the flame and gas path through the furnace.

It was inevitable that the many advantages of coal dust firing should result in the widespread adoption of this mode of fuel burning by boiler plant engineers and managers. Stokers had to be improved to keep them competitive, and stoker as well as stokers furnace improvements were not slow in materializing. That is as it should be, for the stoker still has its field and many

paper mills have adopted these developments in stokering practice to their own profit in several new projects recently completed. Forced draft traveling grates are unique in their ability for the burning of coke breeze and small anthracite and some mills make use of this ability where the fuel supply makes such applications desirable. Stoker furnaces are now being water cooled like powdered coal furnaces in order that high hourly coal burning rates and steaming capacities may also be realized with stokers. The fuel burning capacities and efficiencies of underfeed stokers suitable for eastern high grade coking coals have been greatly improved by increasing greatly their lengths and by providing means for continuously removing ashes in such a manner that most of the carbon is well burned out of them before they are rejected to the ash pit. Clinker grinders under pits with considerable ash storage capacity are used for the larger applications. Large pits are used so that the ash may remain there long enough to burn out completely before being ground out. Better means for air control are now also available and preheated air is now used quite often.

Attempts to produce turbulence in stoker furnaces, especially in furnaces fired with travelling or chain grate stokers have proved successful and this line of development based on the experience of powdered coal users has resulted in the rear arch and mixing throat. The utility of the rear arch is as yet imperfectly understood by most engineers but it is a very sound arch development. By means of it, low grade fuels high in moisture and ash and low in volatile may be burned without ignition difficulties. Most of the air is introduced into the furnace under the rear arch from the rear air compartments of the stoker, and if the rear arch is set close to the stoker, so that it may deflect the flames and burning gases toward and against the incoming fuel at the front of the stoker, it is possible to cause immedate ignition of wet lignites, high ash and low volatile solid fuels such as coke breeze or fine anthracite otherwise hard to ignite without the use of heat reflecting or radiating surfaces. A properly designed rear arch stoker need not have the assistance of refractories in the furnace,

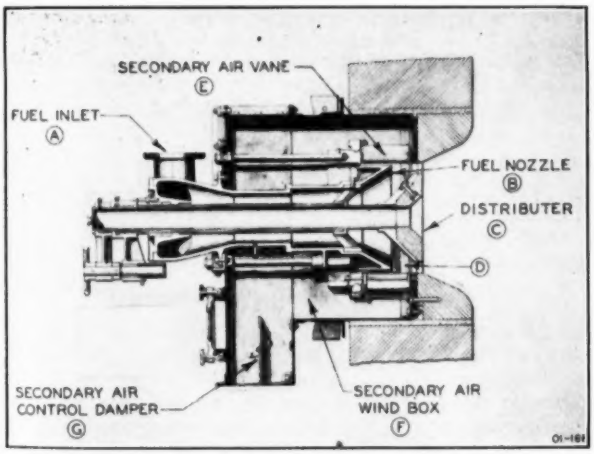

FIG. 4
Horizontal Turbulent Burner.

nor need it have a front arch. The rear arch can be, in fact should be completely water cooled. If a short front arch is used it should be water cooled as well. It has been demonstrated in several rear arch applications that radiant heat reflection from arches is of less consequence than usually supposed. A modern application for the burning of coke breeze in a furnace entirely water cooled, even as to arches, is shown in Fig. 2. Anthracite fines and lignites are now being successfully burned in such furnaces.

The steaming capacity of a boiler can be increased by increasing the fuel burning capacity of its furnace. Furnace maintenance limits furnace capacity. The obvious way to eliminate furnace maintenance which is synonymous with refractory maintenance is to eliminate refractory from the furnace. This may be done by putting part of the boiler around the furnace and replacing refractories with water or steam cooled surfaces, thus eliminating the most serious limitation to high combustion rates and high capacities, namely refractory maintenance. Water cooled surfaces have proved satisfactory for the protection of stationary

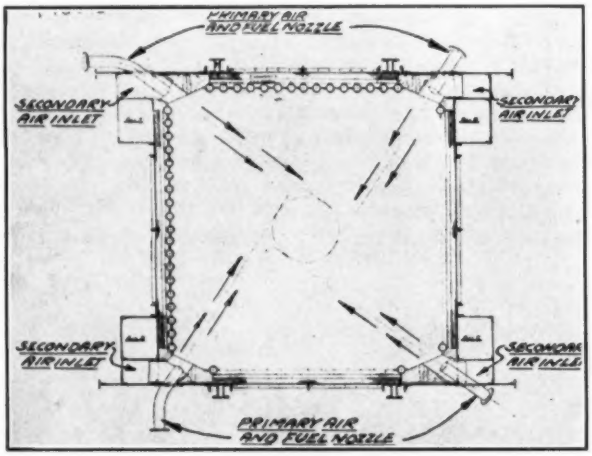

FIG. 5
General Arrangement of Burners in a Tangentially Fired Pulverized Fuel Furnace, Showing Points of Introduction of Fuel, Primary Air, and Secondary Air.

boiler furnace walls and furnace maintenance is no longer an obstacle to the application of highly preheated air for combustion. Water cooled furnaces bring out the maximum possibilities of fuel burning apparatus because such furnaces set no limit to the amount of mixing and turbulence that is permissible in the furnace. Erosion or melting down of furnace walls does not worry the water wall user. Nor need he govern the amount of excessive air or the temperature of the air by considerations of furnace maintenance for the furnace is safe from the effects of high temperature.

The furnace temperature is controlled only to keep the boiler from slagging and to keep the ash in furnace in such a form that it may be readily rejected. With these necessary limitations, which vary in importance with the character of the coal, the kind of boiler, and on the ash removing means installed, higher temperatures and more efficient combustion are being maintained today in completely water cooled furnaces than was ever possible in the best refractory furnace. The reason is "turbulence." The furnace designer can now go the limit in producing mixing burners and turbulent combustion, since he need have no fear that too much commotion during the burning process will damage the furnace nor that highly preheated air will do this. Combustion rates of 30,000 B.t.u. per cubic foot per hour and coal burning capacities of 60,000 pounds of pulverized coal per hour per furnace are now being realized in water cooled metal furnaces subject to turbulent firing with highly preheated air.

Someone in every technical meeting wants to know whether water walls cause smoke and in other respects interfere with combustion. The answer is that smokeless combustion is being obtained all over the world in completely water cooled furnaces at higher rates of combustion and with lower excess air than was possible with refractory furnaces as the mixing process is being carried out so much better and the commotion or turbulence so much greater in the water cooled metal furnace. Of course, the water cooled walls absorb heat from the furnace and tend to cool the furnace. But water walls can stand higher temperatures than brick walls. Lower amounts of excess air and hotter air

may be used in such furnaces than in brick furnaces and hence temperatures are actually higher in water cooled furnaces than it is practicable to maintain in brick furnaces. It is no more difficult, with properly designed fuel burning apparatus, to maintain combustion in a water cooled furnace than in a brick furnace. It is impossible to put enough water cooling surface in a furnace to cause the fire to go out if the burner is of proper design. Experience proves this. Every furnace, even a refractory furnace, is a cold furnace every time it is started up. No one doubts that a cold furnace can be lighted and started up. Completely water cooled furnaces have been used for a hundred years. Locomotives, marine boilers, house heating boilers, all have completely water cooled furnaces. I dare say most of those present have water cooled furnaces in their own basements. Water cooled surfaces are installed primarily to eliminate furnace maintenance outages. But a derived "by-product" advantage of water cooled surfaces is their steam making capacity. A square foot of such surface will develop from ½ to 1½ boiler horsepower. It is evident that such surfaces will earn their keep, first by the savings in furnace maintenance and outage, and second, by the steam produced. Water-cooled furnace linings are responsible for a considerable portion of the steam production of units so equipped.

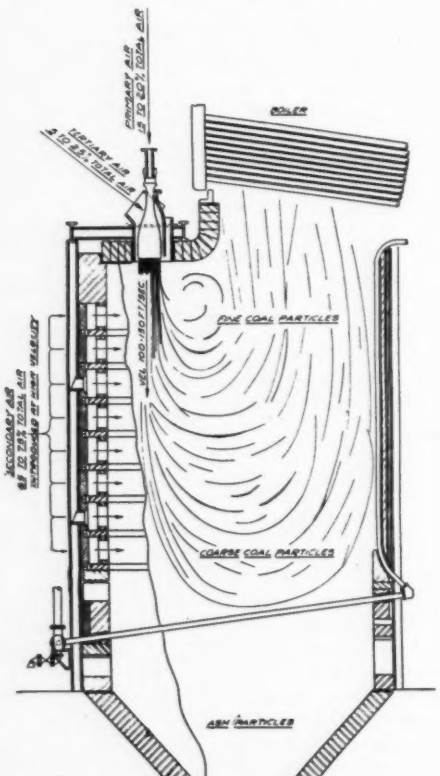

FIG. 6

General Arrangement of Vertically Fired Pulverized Fuel Furnace, Secondary Air Introduced at High Velocity At Right Angles to Fuel Mixture.

Good Mixing and Turbulence Keys to Higher Combustion Rates

The turbulence now available in water cooled pulverized coal furnaces is essential for efficient and smokeless combustion at high rates, as the rapidity of combustion depends almost entirely on the rate of mixing between the combustibles and the available oxygen. High temperatures result from rapid combustion with low excess air and are therefore the effects and not the causes of rapid combustion. The development of turbulent modes of firing pulverized coal was retarded considerably until water cooled furnaces were developed, for brick furnaces did not stand up under the erosive action of the hot swirling gases and fuel.

Fuel must continually come in contact with fresh oxygen during its passage through the furnace, and so the relative movement between fuel and air must be rapid. Turbulent flow tends to produce such relative motion by rapid changes in direction and speed.

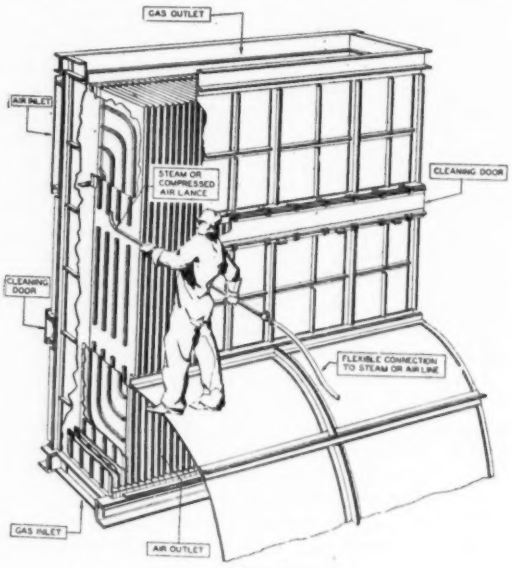

FIG. 7

Plate Type Air Preheater. Elements May be Cleaned With Steam or Air Lances.

The relative motion results from the large density differences of the solid particle and the gases. The effect of turbulence in improving combustion efficiency may be measured by comparisons of the loss due to incomplete combustion as revealed by the carbon in the ash. Fig. 3 shows how the carbon loss in one plant fired vertically with powdered coal was cut in half by increasing the velocity of the secondary air.

Turbulence is produced by mixing burners, such as shown by Fig. 4, or by the impingement of flames against each other at high velocity, as in tangentially fired furnaces, such as shown by Fig. 5, or by causing air jets to impinge on the flames at right angles at high velocity as shown by Fig. 6. In stoker furnaces turbulence is caused by over fire air injection and by the use of the mixing throat and rear arch, as shown by Fig. 2.

Preheating of Air Also Advantageous

Air heaters, such as shown by Fig. 7 which have no moving parts and which are easy to clean, offer a means of economically recovering heat that would otherwise be lost. In such air heaters alternating thin layers of gas and air separated by metal plates flow past each other at high velocity and counter-currently. The hot air returns heat to the furnace that would normally be lost to the atmosphere in the stack gases. Furthermore the preheated air accelerates combustion and brings about gains in efficiency and economy greater than those directly calculable. Preheated air is used in conjunction with all methods of fuel burning; stoker firing, oil burning, gas burning and pulverized coal firing. The economies derivable depend on the price of the fuel and the use factor of the plant.

Paper mill engineers have not been indifferent to these developments, and were among the first to follow the lead of the central stations to adopt the latest developments in steam making practice.

Many have adapted pulverized coal for some of their steam plants. Some burn pulverized coal or oil in the same furnace

when the fuel market warrants it. Others have modern underfeed stokers or travelling or forced draft chain grates.

Water walls and air heaters are standard boiler room equipment in many paper mills. A great deal of the timidity at first displayed in the application of water cooling surfaces in place of furnace refractories is disappearing since paper mill engineers have found out in their own plants that water cooled furnaces can be kept hotter than brick furnaces and for longer periods. Managers of paper mills will discover in time that their boiler rooms are not just dirty corners of the plant to be kept away from as much as possible, but a place where money is being spent that should be saved. Many such boiler rooms can be remodelled and modernized so that the capacity of the installed boilers may perhaps be doubled by raising the boilers and by putting new furnaces under them and by installing suitable fuel burning equipment to service them. A natural increase in demand for steam that cannot be met by extending the boiler plant or by building a new boiler plant can be met by making the old boilers do twice as much work, by water cooling the furnaces, by installing air heaters and by doubling the capacity of the fuel burning equipment.

The capacities and efficiencies of steam generating units of usual dimensions have been extended, chiefly by improving furnaces, fuel burning equipment and by the utilization of heat recovery devices such as air heaters. Furnace reliability, capacity and efficiency has been improved by substituting for perishable refractory furnace linings, water and steam generating surfaces which can stand the intense turbulence and high temperatures produced by the improved fuel burning equipment now available. The requirements of powdered coal firing speeded up these furnace developments and encouraged parallel development of stoker, stoker furnaces and furnaces for the simultaneous utilization of several fuels such as oil, gas and pulverized coal. Central stations exploited these developments first and realized the economies disclosed by them. The same developments were available to paper plants and other industrial units making their own steam and many of them have already adopted them; the paper mills probably more enthusiastically than any other group. No doubt this is due to some extent to the fact that many of the paper makers are also power sellers and hence had the "utility" point of view more strongly developed than the other industrials.

Heat, Light And Power Committee Studies Stock Pumping*

By John F. Rhodes, Chairman[1]

We wish to report very favorable advancement in the paper industry as to the acceptance of modern ideas in applying equipment both for power saving, lowered costs and saving of waste. "Continuity of operation" is one of the essential requirements of an up-to-date mill, and without it, one of the large losses of "Production Efficiency" results.

In our work of the last year, a résumé of the good work already done by previous committees was necessary in order to avoid repetition. However, we have continued those subjects that needed further study.

The usual correspondence and resulting trend noted, suggested a repetition in subjects already amply covered in the past. We also wished to avoid papers where selling propaganda was the object. We do not hesitate however to give credit to the manufacturers of equipment for advancement in the industry.

We have worked on some of the more important subjects suggested to us by members. Papers were presented at the Fall meeting at Wausau, Wisconsin, and the following papers have been prepared for your information and comments at the Sectional Meeting. A round table discussion will be part of the program if members are interested.

A—*"Thermal Economies of the Steam Cycle in Industry"* arranged for by H. W. Rogers and A. G. Darling, of the General Electric Company, Schenectady, N. Y. (Note: This may not be completed in time for the Sectional meeting in February.)

B—*"Paper Mill Power Plants Keep Up with the Times"* by Martin Frisch and F. W. Heller, arranged for by the Combustion Engineering Corporation, through Mr. Carl Stripe.

C—*"The Grewin System,"* written by H. G. Rappolt, New York office, and A. E. Montgomery of Chicago office, to be read by Mr. Rappolt, arranged for by the J. O. Ross Engineering Corporation, New York.

D—*"Paper on Sectional Drives for Cylinder Moulds and Primary Presses,"* by K. L. Howe and S. A. Staege, arranged for by W. W. Spratt, Association Activities, Westinghouse Electric and Manufacturing Company.

During the last year a good deal of study has been given to the application of heavy duty pumps for handling high consistency pulp stocks around 5 per cent or slightly heavier.

We were in communication with several of the leading pump manufacturers and found them only too glad to co-operate with us in any way, to work out net data. Since then, several new pumps have appeared in both the centrifugal and rotary type, which are more suitable than previous models, the impellers being decidedly different than previous types.

In connection with this development, we felt that information was lacking in regard to friction tables for flow of stock in pipes especially for stock of these consistencies, and varying considerably as to slowness or freeness.

We found that no one pump manufacturer wanted to bear the entire burden of carrying on experiments and compiling tables only perhaps, for their own use.

In the opinion of the committee, this could be best carried out at a university, where interest and some student work would be acceptable in making tests and compiling tables. It is considered first, that the work must be well done and correct. We found that pump manufacturers were willing to furnish pump equipment where necessary and no doubt pulp of different kinds could be easily procured from the mills.

This was thought to be the best way to accomplish this work independent of any pump manufacturer, paper mill, or otherwise, and in which each could be individually represented.

The next question is to find the university with the necessary space etc. McGill is finishing, or has finished, a large building for paper research work. In corresponding several months ago, this could not then be attempted.

I would like to receive comments from other members who have any ideas as to whether it should be carried further.

The Future

Our advancement in the future should consist of continued interest in "Chemical and Engineering Research" to discover and apply new methods, and above all, to eliminate waste all along the line and conserve natural resources, which are not inexhaustible.

About one hundred years ago we exploited the steam engine and a few hundred other things. The inevitable result is that things of yesterday must pass and allow for further progress. My suggestion for the committee work for the coming year is to select subjects for further progress in the art.

* Presented at the Annual Meeting of TAPPI, Feb. 21, 1929

[1] Member TAPPI. Chief Engineer, Mead Pulp & Paper Co., Chillicothe, Ohio

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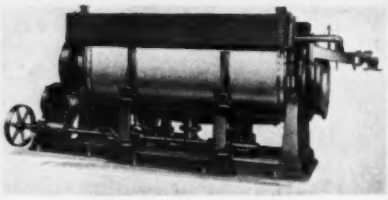

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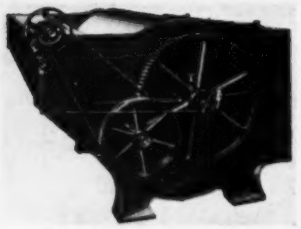

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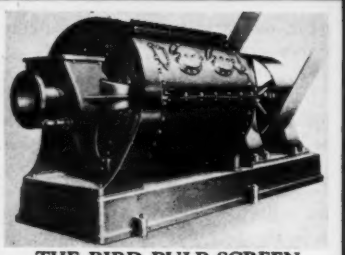

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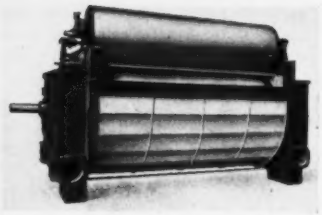

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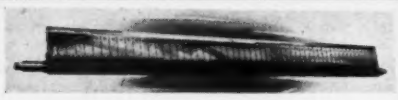

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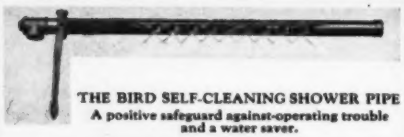

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Sectional Drive With Individual Motors For Each Cylinder Mould And Primary Press *

By K. L. Howe [1]

On cylinder machines it has been universal practice in the past to depend upon the first press felt to drive the cylinder mould and primary presses. Operating in this manner, the felt has been required to perform not only its natural function of assisting in the formation and drying of the sheet but to operate as a belt driving the cylinder and primary presses. It has been recognized by almost everyone that a drive which would relieve the felt of the burden of driving the cylinder mould and primary presses and which would still maintain proper draws and proper tension in the felt between sections would be a very great improvement over present practice. It is evident that to obtain these results independent drives capable of developing the required driving effort when maintaining the proper speed relation must be applied.

The major advantages to be obtained from such a drive are greatly increased life of the first press felt, improved formation and greatly increased strength of the sheet, sustained capacity at maximum production, increased life of wire cloth covering on cylinder moulds, almost complete elimination of felt stretch and the complete elimination of felt and sheet stretch between cylinder moulds and first main press.

Installation on Pacific Coast

A successful drive of this type in which individual motors are applied to each cylinder mould and primary press has at last been developed and perfected and is now in successful operation at a prominent paper mill in the Northwest.

By means of this type of individual motor drive each motor operating on the first press felt automatically accommodates itself

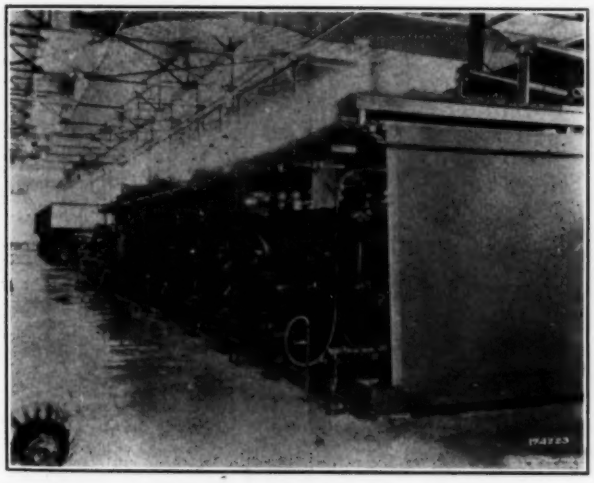


FIG. 1

View of front side of the paper machine showing arrangement of felt and cylinder moulds.

to the speed of the felt and develops an amount of torque sufficient to overcome the friction of the section which it is driving and to hold the felt taut. Each of these motors is adjustable for any desired amount of tension on the felt and will maintain that tension uniformly.

These small motors are operated in parallel with the first main press motor and start and stop in synchronism therewith. They contribute their proportion of the starting torque during acceleration and their proportion of the total driving power during normal operation within the operating speed range.

These small motors on the cylinder moulds and primary presses do not have speed regulators nor is any attempt made to hold them to a specific speed. The characteristics of these motors are such that they will automatically develop substantially con-

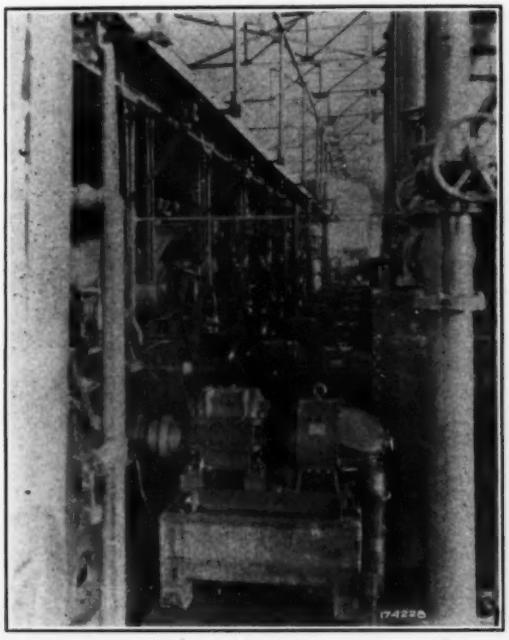


FIG. 2

View showing individual motor drives and gear units on the seven cylinder moulds.

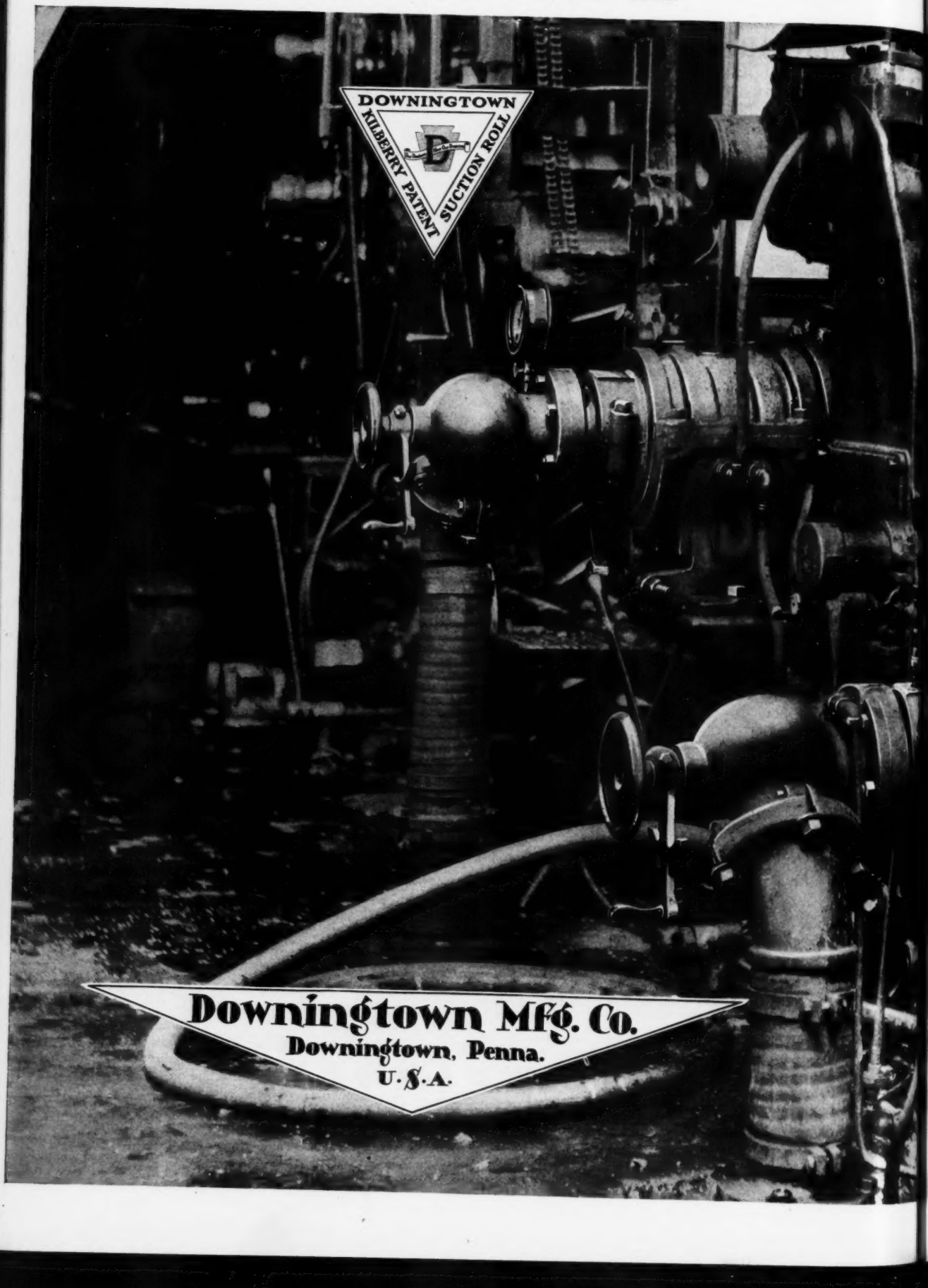
stant torque for any desired torque adjustment. The speed of each motor, automatically adjusts itself to the speed at which the felt is travelling at any and all times, hence the draws between the various cylinder moulds and presses are unaffected by any elongation or shrinkage of the felt that might occur.

The installation on the Pacific Coast is the first one on record where individual motors have been applied to each of the cylinder moulds and primary presses in addition to all of the main sections of a cylinder paper machine. This machine is a 130 inch Black Clawson cylinder board machine having a speed range of 75 to 300 feet per minute. There are 26 section motors including the winder. The motors on the various sections are rated as follows: 7 cylinder moulds each driven by a 3 hp. motor; 3 primary presses each driven by a 7-½ hp. motor; two baby presses each driven by a 15 hp. motor; 100 hp. motor on the first press section; 35 hp. motors on each of the 5 drier sections and on each of the second and third presses and on the smoothing press; 70 hp. motors on each of the 3 calender stacks and a 27-½ hp. motor driving the reel.

The paper machine, in general, conforms to accepted standard practice, and all of the main sections of the machine are provided with standard Westinghouse sectional drives with rotary contac-

* Presented at Annual Meeting of TAPPI, New York, Feb. 19, 1929

[1] Engineer, Westinghouse Elec. & Mfg. Co., Seattle, Wash.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tor speed regulators whereas for the small motors at the wet end individual hand rheostats are provided so that the draw for each individual unit can be adjusted by the operator for any desired value. The motors are connected to the intake shafts of the paper machine through suitable reduction gear units making a very compact arrangement of drive. The winder is of the variable speed D.C. type providing a low and steady threading speed with smooth acceleration up to maximum running speed or to any intermediate speed as desired.

It is of interest to note in the operation of this paper machine, that in varying the speed over the entire range from 75 to 300 feet per minute no adjustments of the drive equipment are necessary and the load on the several motors at the wet end remains so well balanced that no appreciable change in draw or tension can be detected.

Preliminary Tests

A test made before the first press felts were put on is of interest in showing visually with what precision the draws are maintained. A two inch linen tape of surgical braid was threaded through the machine in the usual place occupied by the lower first press felt, except that the tension rolls were omitted. When the tape had been spliced together the first main press motor together with all of the small motors were started and the machine operated in this manner with nothing to hold these sections together except the motor characteristics and this two inch tape. It was possible to operate the machine over the entire speed range without further adjustment, without breaking the tape and without appreciable change in its tension. Furthermore, it was possible to so adjust the tape that there was a sag between each section and this could be maintained substantially constant. Furthermore, the machine could be started and stopped in like manner.

Many efforts have been made in the past to provide mechanical drives of various types and designs for driving the cylinder moulds and primary presses but none have been very successful and it has remained for electrical drive to accomplish this very much desired end.

The Felt Used as a Belt

On account of the lack in the past of any satisfactory drive for the cylinder moulds and primary presses, the first press felt has been depended upon to act as a belt and drive all of the cylinder moulds and primary presses with the exception of the two primary or baby presses next to the first main press. These have usually been driven by means of a slip belt. Although it has been possible to derive some benefit from the slip belt drive of the two baby or primary presses such an arrangement has been far from satisfactory. The felt when designed primarily for the purpose for which it is intended, namely, to pick up and carry the sheet and absorb the water from it, is quite incapable of performing the mechanical function of driving these numerous cylinder moulds and rolls. Because in the past it has been absolutely necessary that the felt drive these parts, desirable characteristics in the felt have been sacrificed in order to obtain sufficient strength to perform the mechanical duties. In spite of the best that the manufacturers have been able to put into the felt in material, design and weave, the life of the first press felt has been extremely short, ranging from one to perhaps three or four weeks on machines where a large number of cylinder moulds are used. The replacement of these felts at such frequent intervals has been extremely expensive. Furthermore, the capacity of the felt when operating under these adverse conditions is rapidly

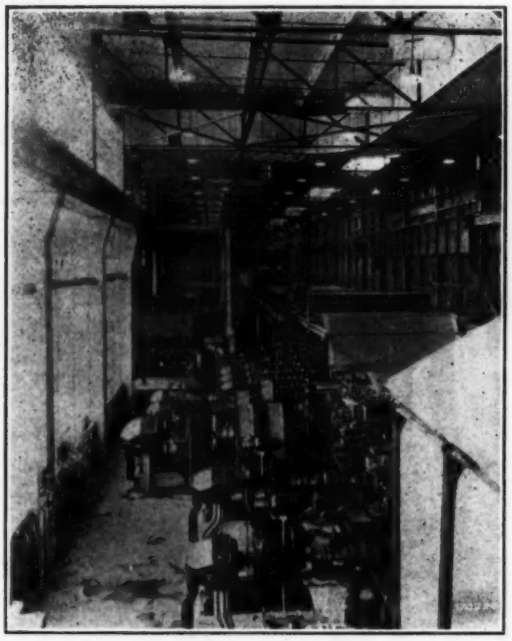


FIG. 4
View showing arrangement of driving units and section speed regulators on the main press sections.

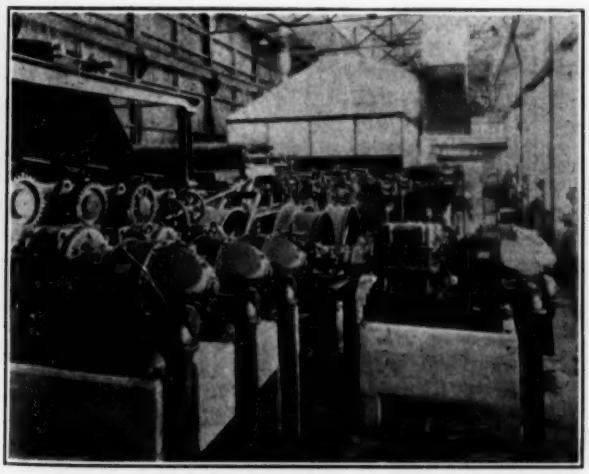


FIG. 3
View showing individual motor drives and gear units on the baby and primary presses.

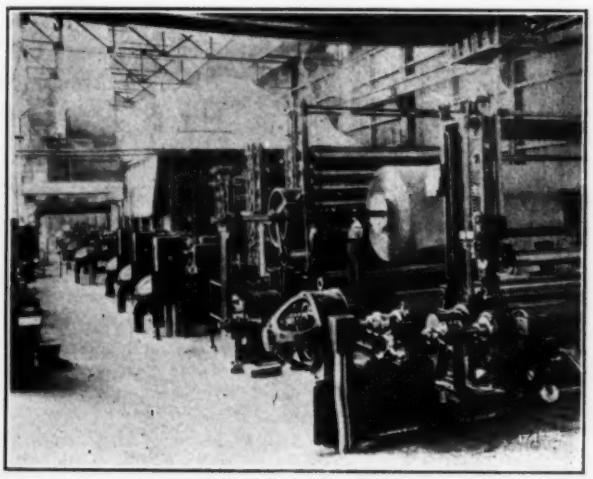
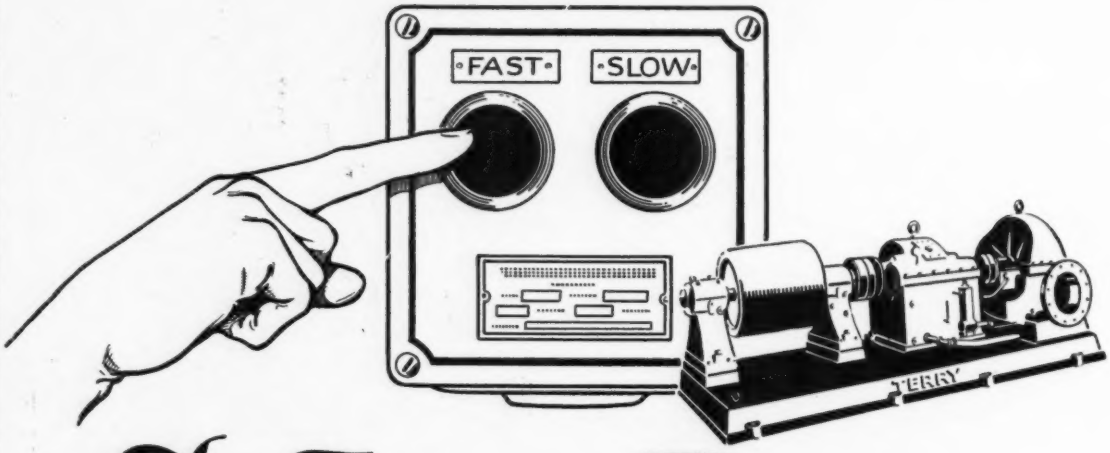


FIG. 5
View of back side of machine showing arrangement of driving units on the winder, calender and dryer sections.

Under *Push Button* Control



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reduced after it is put on the machine due to the extremely high tension under which it has to operate—this tension pulling the strands together making it difficult and requiring excessive whipping to remove the water and dirt.

The Electrical Drive Successful

It is appropriate at this time to point out why it has been possible to make a successful electrical drive for the cylinder moulds and primary presses while this has not been possible with a mechanical drive. A control designed to regulate the cylinder moulds and primary presses for constant speed as is done in the case of the main sections, would not be satisfactory as the motors driving these wet end sections must be able to vary slightly in speed so as to accommodate themselves to the felt speed. However, the flexibility of electrical control has enabled us to make a design which exactly meets the requirements.

In the various efforts of the past to produce a mechanical drive for these wet end sections dependence has been placed upon slip belts, differential gears, friction drive and other devices in none of which has it been possible to obtain the necessary characteristics nor is it likely that any type of mechanical drive for these sections will ever be developed so flexible or with characteristics so well adapted to meet the requirements as it is possible to obtain with electric drive.

Although in the past the desirability of correcting the unsatisfactory condition pertaining to the wet end drive has long been realized, little optimism has been expressed as to the possibilities in this direction. The performance of this equipment at the plant on the Pacific Coast with individual electric drive has demonstrated so conclusively the correctness of the principle employed and the simplicity of the equipment and its control that no further doubt is warranted an the part of anyone. The performance since this machine was started up, indicates that felt life two or three times as long as with the ordinary arrangement of drive can be expected. Although the drive has not been in operation for a long enough period to definitely establish its superiority with regard to other of the advantages anticipated, the indications are that these advantages will be realized.

Ross-Grewin High Pressure Vapor Removal System for Paper Machine Driers *

By A. E. Montgomery[1] and H. G. Rappolt[1]

The Ross-Grewin high pressure system of removing vapor from between the paper machine driers makes use of high pressure air jets entering alternate vapor pockets from the front and back sides of the machine. The system consists essentially of a small positive pressure blower for compressing the air to the desired pressure, heating coils, and a system of headers, drops and nozzles. The nozzles are specially designed to deliver a small diameter jet of heated air at high velocity into the vapor pockets.

At the wet end, where the sheet is delicate and likely to be broken by a strong air current, a special blast pipe with adjustable air ports is used by which the velocity of the jet of air can be closely regulated. Dampers are provided in the distributing headers so that any section of the driers can be favored. Usually more air is concentrated at the second quarter from the wet end, as that section generally evaporates the most water.

One of the basic principles of this system is the injector effect of a high velocity fluid. The small amount of air passing through the nozzles induces a comparatively large amount of air from the room to be drawn through the pocket.

The blower and heater can be set either on the machine floor in back of the driers, or in the basement under the driers. The diagramatic sketch shows the apparatus set on the machine floor. This sketch also shows the arrangement of headers and nozzles.

Origin of System

The Grewin system was invented by Fredrik Grewin who made the first installation on one of his paper machines at Norrkoeping, Sweden. The Voith Company then obtained a license for the use of this patent and in cooperation with the inventor has equipped about sixty or more European machines. Within the last three years it has been introduced into this country, where the several installations made up to the present time have well demonstrated its advantages.

Application

This system supplies a need which has been appreciated for some time, that of affording a means for successfully removing the stagnant vapor from the pockets between the driers on fourdrinier machines using top and bottom drier canvases.

Operators on board machines without drier canvases recognized the beneficial results of blowing air into the vapor pockets years ago and adopted the so-called "vapor absorption system" making use of nozzle pipes extending laterally across the machine in the vapor pockets, blowing a curtain of air directly against the sheet across its entire width.

Due to the space occupied by the felt rolls on machines using top and bottom drier canvases it was usually found impractical to use this system of cross nozzles. The Grewin system fulfills requirements of a machine of this type affording an effective means of removing the stagnant vapor from the pockets without encumbering the machine to hinder the operators in threading the sheet through the driers or in removing the broke.

The complete installation of a Ross-Grewin system can be made with very little trouble whether it be on a new machine or an old one. The apparatus requires little room. The system can be installed during the regular weekend shutdown without necessitating the slightest loss of production.

Advantages

The main benefits secured may be enumerated as follows: (1) More even drying across the sheet, (2) Increased drying capacity, (3) Reduction of steam used per pound of finished paper, (4) Longer life of felts, and (5) Requires minimum amount of steam and power to operate.

Evenness of Drying Across the Sheet

Ordinarily there is a sluggish or stagnant mass of water vapor in the pockets which prevents the center of the sheet from drying properly. Either the edges of the sheet are overdried, or the center runs wet. To balance this effect, the crown on the press rolls is increased so that the sheet entering the driers has less water in the center than at the edges. This is a case of introducing one evil to offset another, since the extra crown is injurious to both the press felts and to the fibers in the center of the sheet.

Now if this stagnant vapor is blown away from the center, and especially if it is blown towards alternate edges in each succeeding pocket, the middle of the sheet has an even chance with the edges of drying out. The excessive crown on the press rolls will no longer be necessary, relieving the press felts of their extra duty, and improving the sheet at the center. the center.

* Presented at Annual Meeting of TAPPI, New York, Feb. 21, 1929.
[1] Engineers J. O. Ross Engineering Co., New York

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If the back of the sheet tends to run wetter than the front, or *vice versa*, the amount of air can be increased on either side by simply regulating the dampers to offset this condition.

It was found on an actual installation that the average amount of moisture in the sheet leaving the driers could be increased from 5 or 6 per cent to 8 or 9 per cent due to elimination of wet peaks.

Increase in Drying Capacity

The rate of evaporation in general on the paper machine is dependent principally on two factors: (1) The temperature of the heat applied by the driers, and, (2) the percentage of saturation of the air surrounding the driers. As the percentage of saturation increases the temperature of the applied heat must increase to accomplish the same evaporative results; if the per cent saturation is decreased, then the temperature of heat applied can be decreased.

If, then, the vapor is blown out of the pockets by a jet of air, and air from the room is induced to replace the vapor, the percentage of saturation will be materially decreased, and the rate of evaporation will increase. The steam pressure can accordingly be decreased for the same drying effect. This increased drying capacity can be used to either increase the speed of production with the same back pressure, or else to reduce the back pressure for the same production.

In practice the Ross-Grewin system has increased the production from 5 to 15 per cent and on one installation where conditions were very severe a 20 per cent increase was made. Where the production was kept constant, the back pressure was reduced 20 to 50 per cent, the actual figures on one machine being from 17 to 9 pounds.

In other cases an increase of production and decrease in back pressure was obtained.

Reduction of Steam Used Per Pound of Water Evaporated

Steam is used in the driers to furnish heat units to accomplish the following:

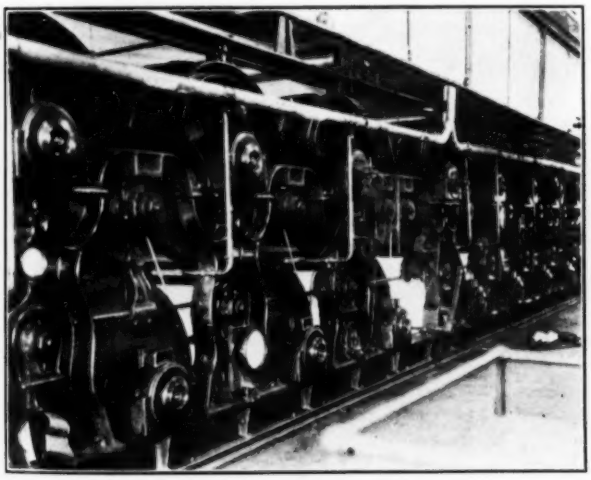

FIG. 1

Ross-Grewin System at Canada Power & Paper Corp. (St. Maurice Div.), Cap de La Madeleine, Quebec.

(a) To heat the bone dry fiber content of the sheet entering the driers from the temperature of the stock at the wet end to the temperature at which it leaves the last drier.

(b) To heat the water content of entering sheet from stock temperature to the temperature of evaporation.

(c) To evaporate the water from the sheet.

By reducing the temperature of evaporation a corresponding decrease is effected in the sensible heat (items a and b) required to bring the water and fiber up to the evaporation temperature. The latent heat, of course, increases as temperature of evaporation decreases, but there will still be an appreciable saving.

Where there is considerable fog, or so-called vapor, in the pockets, which in reality is condensed vapor, some of this may be reabsorbed into the sheet as the sheet passes from one drier to the next. This means that the driers must re-evaporate some of the water that preceding driers have already evaporated. The Grewin system removes the vapor as it is formed, preventing

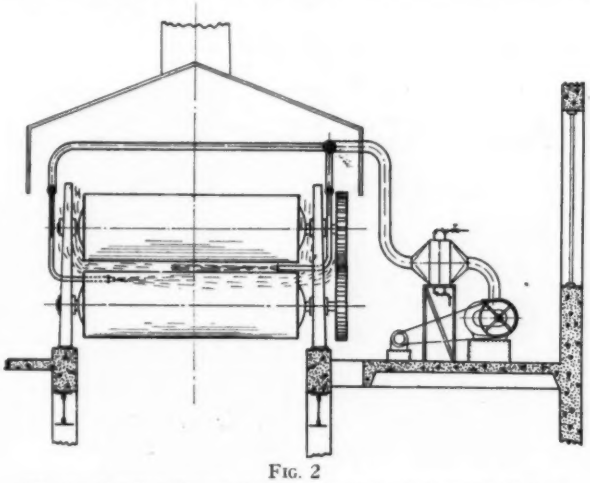

FIG. 2

Diagram Showing General Arrangement of the Ross-Grewin System.

it from being taken back into the sheet. This is an important factor in the total amount of heat units required.

A third distinct steam saving is realized due to the decreased pressure necessary in the driers, which means less back pressure on the turbine or engine driving the paper machine. For the same power output from the turbine, the amount of steam required, or the water rate, will decrease as the back pressure is lowered. This saving is advantageous especially where the heat and power balance is such that before the installation of the Grewin system the exhaust from the turbine is more than enough to supply the needs of the driers when operating at a definite speed.

Increase in Life of Felts

By blowing the saturated vapor away from the drier felts the life of the felts is considerably increased. Data on one particular installation indicate the life of the drier felts has been doubled, cutting the drier felt costs per ton of paper produced in half.

Minimum Amount of Steam and Power Required to Operate System

The Ross-Grewin system differs decidedly from other air systems for a machine in that it is essentially a system for moving the vapor and does not materially affect the ventilation of a machine room. To accomplish the results a comparatively small amount of air is necessary, making possible a surprisingly low power and steam consumption. A 30 ton machine may require only 2 to 3 horsepower and a 50 ton machine 5 horsepower. In steam consumption, a 50 ton machine will require in the heater about 130 pounds of steam per hour, which is almost negligible.

Summary

Briefly, the Ross-Grewin high pressure vapor removal system can be readily applied to any drier nest using top and bottom felts, to produce a more evenly dried sheet, increase the rate of drying, reduce the amount of steam required per pound of paper, and to increase the life of the drier felts, with only a small consumption of steam and power to operate it, and without interference with the normal tending of the machine.

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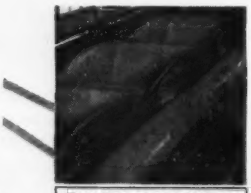
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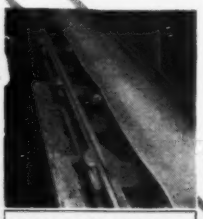
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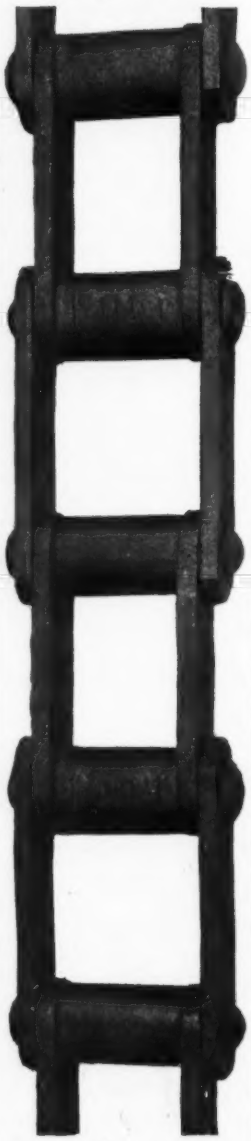

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Handling Materials in the Paper Industry *

By George D. Bearce [1]

Almost every type of mechanical handling equipment is used in pulp and paper mills. New plants are especially designed to minimize the handling of all types of materials, both raw and finished products, and thus lower the cost. Each plant, whether it is a new one or one that has been in operation many years, presents a wide diversity of handling problems, each of which must be analyzed and solved depending upon the conditions. Although there are fundamental principles involved in handling any commodity, it does not follow that equipment suitable in one plant will be equally successful in another plant for the same commodity.

Mechanical handling equipment should be considered wherever there is any hand labor used. If the materials to be moved come in a constant stream and must be lifted, lowered, or carried laterally, this is a problem for mechanical application of equipment. The elevation or lowering of any quantity of heavy materials usually presents a possibility of reducing costs by mechanical devices. The lateral movements of limited quantities of materials is usually a problem that must receive careful consideration.

Many plants determine the cost of handling any particular product, such as coal, pulpwood, lapped pulp, old paper stock, etc. Where the cost of manually handling any commodity by a certain method is known or can be reasonably estimated, it is then possible to figure with a reasonable degree of accuracy the savings that may be effected by the application of mechanical equipment. In every case the cost of manual handling must be weighed against the investment in mechanical devices plus their operation and upkeep. A reasonable rule is that any handling device should pay for itself in a period of two to three years.

Shipping Paper on Skids

Every mill has some problem in mechanical handling. In the lower grades of paper this is usually at a minimum, and in mills where higher grades of paper are made more and more reprocessing is required and the manual cost is materially increased. The reprocessing or finishing cost is closely allied to the handling and moving cost of the semi-finished or finished goods.

Such handling equipment for finished paper as the electric roll-carrying truck, is standard equipment in the modern news print mill. In the medium and fine grade paper mills the lift truck is used in many ways. The use of skids and the lift truck in shipping paper is extending quite rapidly. With the education of the consumer on this particular method of handling paper the skid will doubtless be a more important factor in the future. At the recent meeting of the American Society of Mechanical Engineers, F. J. Shepard, Jr., in his paper "Skid-Platform Shipment of Commodities," had the following to say regarding the use of skids in shipping paper:

"In the past two years the method of packing and transporting paper has undergone a complete change. Whereas formerly all sheet or ream paper was cased in boxes weighing from 500 to 800 pounds each, it is now placed on skid platforms directly from the inspection tables. The loads vary from 4000 to 7000 pounds and after being covered with wrapping paper are squeezed into a solid unit by means of a rigid cover which is drawn down by steel strapping or by long bolts. A single skid platform and clamping cover replaces six to ten cases, whose cost averaged $2.50 each. The labor entailed in handling the large number of cases is done away with by the new methods.

"The direct saving at the paper mill in this method of shipping amounts to approximately $5 per ton, or roughly, three per cent of the selling price of the paper.

"Paper-shipping platforms are of two general types, returnable and non-returnable. The first are heavily constructed with a structural-steel frame and heavy hardwood planking, and after being unloaded by the printer are returned to the mill in carload lots. The non-returnable platforms are of lighter construction, being built of soft wood, and are often supplied by the mill which formerly made up packing cases. The returnable type is commonly used by mills supplying one or two large customers, and the non-returnable type in supplying jobbers and small customers who would not be able to return the skids to the mill promptly.

"One large paper mill estimates that $30,000 invested in returnable skids paid a 100 per cent dividend at the end of ten months' use, and since that time has shown a saving of better than $120 for each working day, or $36,000 per pear.

"A second New England mill, which is at the present time shipping approximately 30 per cent of its output on skid platforms, checks the figure of $5 per ton saved by shipping on platforms, and the saving at this mill amounted to over $100,000 in the past year."

Skids for Water Shipment

At the same meeting, H. E. Stocker in his paper entitled, "The Use of Skids for Water Shipments," makes the following statements:

"Skids weighing 4000 pounds are shipped by the Oxford Paper Company, Rumford, Maine, and measure 58.7 cubic feet or 29 cubic feet to the ton. The same grade of paper in cases weighing 600 pounds measures 44 cubic feet per ton. This is largely because the paper on skids is highly compressed and then tied down with steel strapping or wire. Less broken stowage accounts for the remainder of the space saved. Six cases of 600 pounds take up more space than 3600 pounds of paper compressed into one solid mass. Therefore the use of skids results in a 34 per cent improvement. For the same space the revenue is 34 per cent greater, and this is of far greater influence on net profit than reduced handling costs. A 75 per cent saving of the latter may mean only 70 cents per ton, while a 34 per cent increase in the revenue received for the space used will amount to $1.80 per ton, of 157 per cent more. Of course ships are not loaded uniformly full, but nevertheless the results are impressive. Of even greater importance than this is the fact that if these paper shipments were not accepted by the steamship company because they were packed on skids, they would move via rail. The revenue remaining after deducting the out-of-pocket expense of doing this additional business, far exceeds the savings in handling expenses. In addition to the Portland-New York business the Eastern Steamship Company handles paper on skids from Boston to New York. These skids are hauled from the railroad freight station to the dock by motor truck. No tracks are on the dock at Portland.

"The Boston line also carries printed sheets on skids. These are printed at Boston and bound into books at New York. The Eastern Steamship Company owns some permanent skids which are used in carrying freight between its terminals.

"Paper on skids is shipped from Ticonderoga and Mechanicsville, N. Y. via rail to Albany, thence via river lines to New York. Shipments also originate at Saugerties and other river ports. Altogether there are three Hudson River lines handling paper in this manner."

It will be seen that the use of the skid is becoming increasingly important and appreciably lowers the cost of handling. One pulp mill has used this skid shipment method for dried pulp for a number of years.

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* Presented at Annual Meeting of TAPPI, New York, Feb. 20, 1929.

[1] Member TAPPI; Engineer, International Paper Co., New York, N. Y.

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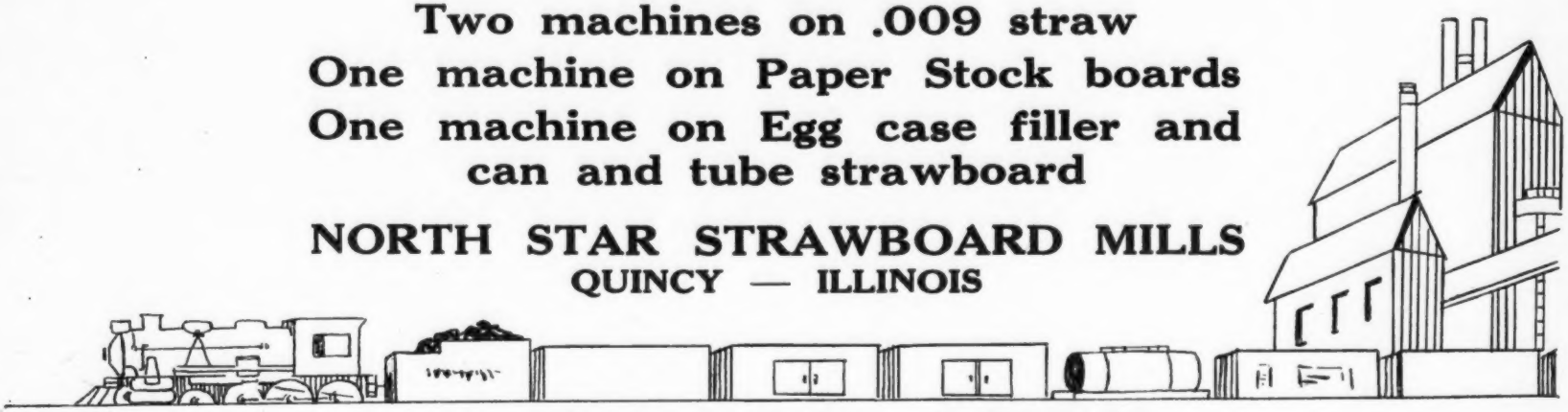

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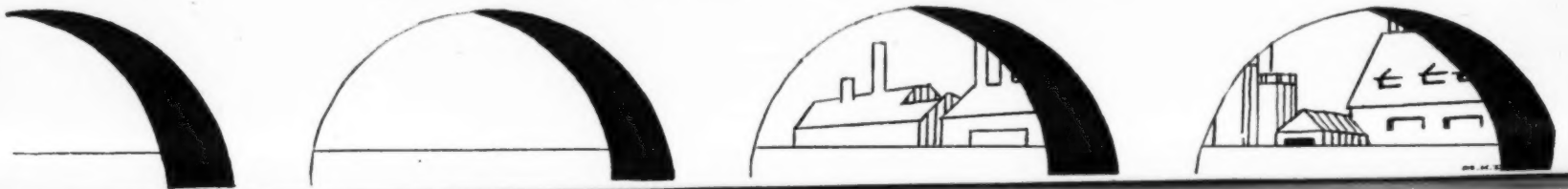


Handling Pulp and Paper Stock

Water is still the most economical and effective method of handling pulp in the mill. However, this is a particular problem of pumping rather than actual handling of materials.

The platform and lift truck are also widely used in the pulp mill. In many cases its use could doubtless be extended with a minimum of cost and a reduction of labor. The use of the platform and the overhead crane can often be applied with satisfactory results. The belt and roller conveyors are standard equipment in many plants for handling sheet or lapped pulp. This has many applications, and the particular conditions under which it must be operated determine its efficiency. In some plants they have eliminated considerable labor by using the plain belt and noodling the pulp from the wet machine. The entire groundwood pulp mill situation has a handling problem that may be corrected and improved as time goes on.

The problem of conveying paper stock and rags is handled in many different ways. Where the design of the storage warehouse is correct, it is possible to use the overhead trolley or monorail system together with the grapple. The hand-lifting of bales of material is a thing of the past in a well conducted plant. In some cases it is possible to apply the usual belt apron or other conveyors occasionally used on baled and loose rag or old paper stock.

Pulpwood

In many plants the handling of pulpwood is a definite problem and requires special study. The pulpwood stackers of various types are used quite successfully in many modern plants. While it is necessary to keep the size of the pulpwood piles at a minimum, it is also essential in the design of a plant to reduce the conveyor system to the smallest reasonable length in order to hold down the upkeep. In reclaiming pulpwood from a loosely stacked pile a crane and wood grapple are used very effectively. In one large Canadian mill the writer recently saw a small caterpillar tractor and a wood grapple operated as rapidly as a steam shovel would in a large city. This grapple took a load every 20 seconds and only required three men (one operator and two on the pile).

Wherever possible plants have installed water conveyors to bring the pulpwood into the groundwood and sulphite mills. This has a double advantage of cheap transportation and washing the wood to a certain extent. Most mills use the typical button and cable conveyors, movable side conveyors and similar equipment to reclaim the pulpwood and send it back to the mill.

Other Raw Materials

The handling of lime, limestone, sulphur, clay and similar materials each presents a definite problem. However, if the wheelbarrow is still in use the methods of handling should be carefully scrutinized. The use of belts and bucket conveyors can often be adopted at a very decided advantage. A number of mills are handling clay and other granular materials with an air suction. This has the advantage of rapid handling of materials and eliminates the offensive dust conditions which usually accompany the handling of cars of this type of material.

Coal

The handling, storage and reclaiming systems for coal are very well developed. This commodity is handled in many ways, but where room is available the use of the drag scraper to and from the coal pile appears to be the simplest, cheapest and most effective method. The use of the crane is also widely adopted. Belt conveyors, bucket elevators, scraper conveyors and similar equipment are used in numberless combinations. Upkeep is an important problem of coal handling equipment, and the various systems should be analyzed with this in view.

While it is impossible to cover the entire field of materials handling in the paper industry, the above comments possibly touch on the high lights of this problem. Every mill should make an adequate survey of their handling conditions and should attempt to minimize the use of manual labor, which also means the lowering of costs.

Future Outlook for Training Program*

By Harold G. Noyes[1]

A very complete report of the activities of the Committee on "Training for the Industry" has been presented by Allen Abrams, who until recently served as its chairman. Under his direction and counsel the work of the committee was brought to a point where it was recommended that the active work of the committee be placed in the hands of a paid secretary. This recommendation was made at the Fall Meeting at Wausau, Wisconsin. Since that time it has been deemed advisable to continue the committee in an advisory capacity. Upon my assuming the chairmanship, January 1, 1929, the members of the committee who served under Mr. Abrams were asked to continue service on the committee and Mr. A. T. Gardner of the Combined Locks Paper Company, Combined Locks, Wis., was made a member representing the Wisconsin-Minnesota area.

It would seem that the success of the work in the future depends upon the selection of a man to head the program who possesses the background of education and experience to initiate an active program early enough in the year to guarantee its operation during the summer of 1929. Immediately a survey of the mills operating in the several areas should be made. Such a survey should ascertain the following things:

1. If the company will participate actively in the training program by placing one or more university or college students during the summer months.
2. Types of jobs on which such students will be placed.
3. Rate of pay student will receive for such employment.
4. Date when student may start work.

Simultaneously with this questionnaire a contact should be made with some person in authority in the cooperating college or university to ascertain:

1. Number of students interested in a summer job in pulp and paper mill.
2. Localities where such students prefer to work.
3. Rate of pay desired.
4. Likelihood of students entering the industry permanently upon graduation.

The person charged with the responsibility of carrying out this program should have authority on part of mills and schools to make necessary contacts and be responsible for initiating, developing and actually carrying the plan into execution.

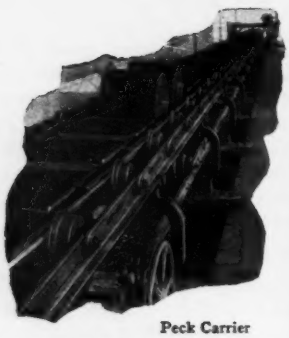
Personnel visits to industry and interviews with heads of college departments are necessary to secure coordination of effort on the part of those affected by the plan. Within the mills some official should be given the responsibility of keeping in touch with the student workers to enable them to get as much as possible out of the three months in industry.

Members of the Committee on Training for the Industry can do much in selling the idea to the various firms and all TAPPI members can lend invaluable assistance by personal work and can contribute much to the student's education while he is on the job.

New ideas are welcomed at all times by the committee and the cooperation of every TAPPI member is solicited at this time in fostering and promoting a program which will mean much to the Association and the industry in the future.

* Presented at Annual Meeting of TAPPI, New York, Feb. 21, 1929.

[1] Associate Member TAPPI; Appleton Vocational School, Appleton, Wis.



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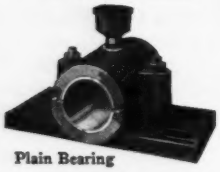

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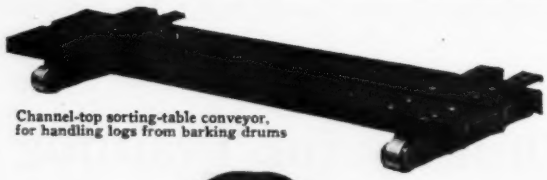

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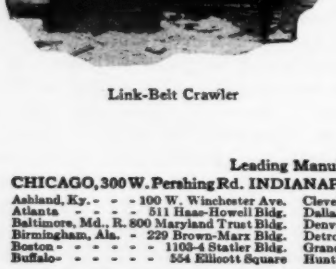

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Corrosion in Paper Mills*

By I. R. McCall [1]

Corrosion is one of the big profit consumers in the paper industry. It is a glutton that eats structural steel, tanks, penstocks, machinery, piping, etc. Heroic measures must be taken to curb its activities. Most steel structures in paper mills are apparently healthful, full of vitality, life and energy, yet corrosion goes on much in the same manner that an ulcer attacks a human body. At first there is a slight irritation which is neglected. This irritation becomes annoying and finally incapacitates the body so that it cannot work, which means loss of time and cellular structure that cannot be replaced. If the slight irritation had been given proper treatment there would have been no loss. The same is true of corrosion: it is first a slight irritation that will magnify many times if no attention is given it. Man-made structure has some advantage over the human body in that the parts destroyed can be replaced but the process is very expensive indeed and can be avoided by proper treatment before the condition becomes what is really a disease. This paper will therefore treat in a small way the problems that confront the maintenance engineer insofar as corrosion is concerned.

Corrosion Theories

Three theories to solve the cause of corrosion have been advanced. However, the carbonic acid theory and the peroxide theory have been discarded, while the electrolytic theory is now universally accepted as being the true cause of corrosion. This theory, briefly stated, is as follows:

Every metal, when placed in water or in an atmosphere which acts as an electrolyte, or in such conditions of exposure that a film of moisture may condense on it, tends to dissolve. This tendency is governed by impurities, unequal stresses and unhomogeneous nature of the metal in each case, and by the hydrogen in the liquid or gaseous film. Certain points in the metal, which have varying tendencies to go into solution, form electrodes of opposite nature, and corrosion takes place in proportion to the potential difference between these points governed by the value of the electrolyte of opposite nature and film connecting them. The more concentrated the hydrogen ions in a solution (as in acids), the higher will be the electric conductivity, and the more rapid, consequently, the corrosion of the underlying metal.

It is clear, therefore, that in a fabricated structure this action between points applies not only to each surface in detail, but to a whole structure of which the members are of varying composition or subject to varying stresses.

Processes of manufacture create one of the active accelerators of corrosion. Treatment of steel by heat, rolling, bending, etc. create what is known as the black magnetic oxide of iron, often called the blue mill scale. This scale is not a part of the metal and it is electro-negative to the steel or iron. It forms a surface which actively promotes corrosion from the moment it is exposed unprotected to the atmosphere. Corrosion is hastened in proportion to the amount of moisture in the air and acid present. Obviously immediate steps must be taken by the fabricator to prevent any physical or chemical action.

Inspection

One of the most valuable assets a paper mill organization can have is a man who makes numerous careful inspections of the mill and insists continually on the cleaning, painting and treating of the steel and iron surfaces affected, to a point where he is almost a pest. Such a man is an asset, for he will save many thousands of dollars in maintenance and replacement cost during the course of a year.

What does an inspection consist of? Many engineers have so many duties to take care of that the structures housing the industry are given very little consideration after they are erected and production is started. Now and then an hour will be devoted the hurrying through the mill with the painter or the foreman of the department and visible rust or scale will be noted and pointed out. Instructions will be given for the painting of such surfaces. When another inspection is made in six months the engineer is rather surprised to note that these places are just as bad as they were six months previously. Instructions are again given for the painting. Inspection continues until it becomes an old story and the corrosion is taken for granted. This type of inspection is a waste of time, money, material and patience. Inspections should be made frequently and periodically (at least every four months) and they should be minute in detail. The inspector should be held responsible for the supervision of the entire maintenance operation. He should not be concerned with production. A mechanic's hammer to knock scale from the surfaces, a steel scraper to uncover corrosion going on beneath paint films, a strong electric flash light that will reveal neglected surfaces that are more or less inaccessible will help greatly. Such data as are available concerning previous paintings, the types of paint materials applied should be consulted. This information can be used as a check against the labor and the paint engineer who made the initial recommendations.

Frequent references will be made to the types of materials. These will be discussed in detail following the discussion on inspection.

Let us start on a short tour of a mill and see what can be found.

Investigate the Mill Dam

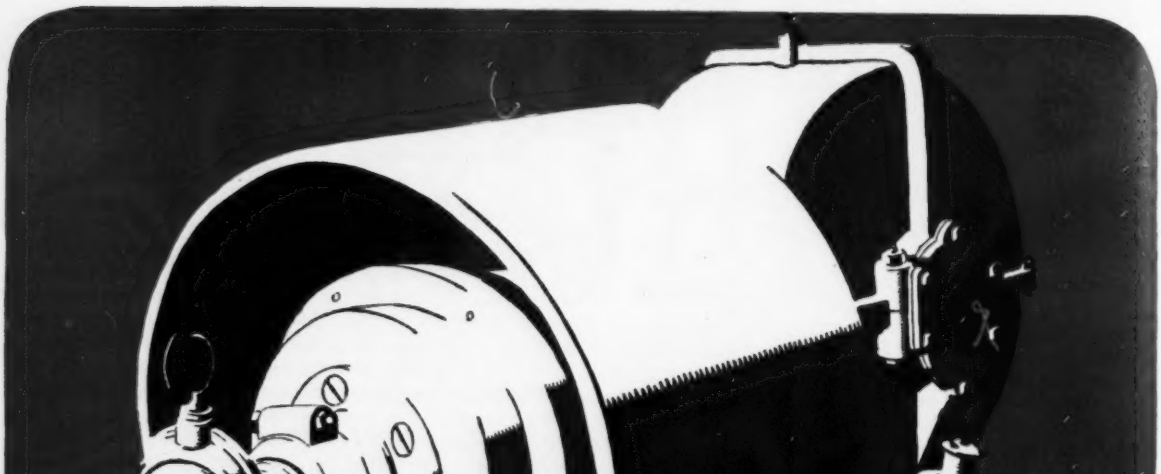
The dam will be our starting point. Let us assume it is the spring of the year when there is plenty of water and some of the gates are open. The first thing we see is the upstream side of the Tainter gates. One can almost imagine a severe case of small pox, so numerous are the pits and blisters that have been formed. The engineer is informed that these gates were painted last spring and that a highly recommended asphalt paint was used. The condition confronting us is not surprising in the least. Many things might produce this effect. The acid reaction of the water, vegetable growth in the water, but often the principal reasons for the condition are improper cleaning and improper painting practice. We knock off one of the blisters and note the surface beneath is quite clean and bright. It is natural to assume that the surface is clean after the blisters have been removed, but if a knife was used on the uncovered spots you would find the metal had disintegrated and free carbon would be left to a considerable depth. Pitting and other forms of corrosion will also be noted. Cleaning is therefore emphasized, and sand blast is about the only positive method that can be employed. After cleaning, the proper type of paint material must be used and it must be applied as soon as the surface has been cleaned.

The downstream side of the gates shows much surface rust and scale. Careful inspection, using the scraper, reveals painting over dirt and scale. But one of the real reasons for this condition may be due to faulty construction. Channel iron may be necessary in such type of construction but ways and means most certainly can be used that will permit water to flow from these surfaces. Hand railing, lamp posts show much evidence of rust and peeling of the paint. Probably the only thing that can be blamed in this case is the selection of the wrong type of paint material. Cleaning and types of paint material are the factors to be considered.

A large crack in the concrete is noted. This is disconcerting

* Paper presented at Annual Meeting of TAPPI, New York, N. Y., Feb. 20, 1929.

[1] Associate Member TAPPI, Detroit Graphite Company, Milwaukee, Wis.



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to an engineer who has been careful in his designing and with his specifications. Settling or shifting of the foundation may have caused it, but what was done to protect the steel the concrete encases? How much electrolysis is taking place? These are interesting questions. Designing and construction engineers usually have taken for granted that concrete will protect the steel against the action of corrosion. Others have used a good linseed oil paint as a finish coat, only to find that protection has been a myth. Experiments have been conducted to determine the effect of concrete on paint and a number of surprises were in store for us when the results were made known. We soon learned that corrosion will break or crack concrete in a very short time and that the ordinary paint film has no life under such conditions. We will discuss this subject further on in this paper.

The Hydro Power Plant

Let us pass on to the hydro power plant. One of the machines should be shut down. The painter possibly will point out that this plant is the show place of the mill and it is the pride of his heart. Let us go down inside of the penstock and look at the penstock gates, water wheel housings and the water wheels. Here will be found corrosion in varied degrees of severity. The chemistry and the physical condition of the water, and painting practices usually will tell the story. Cleaning and the dryness of the surface before painting contribute a great deal toward the success of the repainting job. Obviously proper painting at the time of construction would have helped greatly.

The Grinder Room

The structural steel in this department should be inspected carefully, for corrosion is usually rapid at the joints where moisture will stand, and contacts with masonry, particularly should be noticed. Unless care has been given these parts frequently, a few years exposure will suffice to completely disintegrate the steel at these points. Replacement in such cases is usually necessary. The reason for this is solely the acid condition of the steam coming from the grinding machines. Again cleaning and dryness at the time of the painting are most important. Penstocks, piping, hand rails, and machinery should be looked to.

The Digester Department

The digester department next demands our attention. Heat, condensation, improper care at the time of installation are factors that turn the maintenance engineer's hair gray. Corrosion runs a pace that is hard to cope with. Structural steel, piping, metal stairways have been painted with little or no success. Much scale and rust are apparent. Treatment depends on three things; first, proper cleaning of the surface; second, dryness of the surface before painting; third, the proper types of paints that will resist the severe exposure. Frequent inspections and paintings are necessary for it must be remembered that a paint skin is a vegetable oil film a few hundredths of an inch in thickness and the work required of this flexible film under the conditions a sulphite mill presents is most severe.

The same department in a sulphate mill will not experience as much trouble, a certain amount of care of course is necessary, but careful cleaning and the selection of the proper type of paint material is usually sufficient to afford protection over a long period of time. The recovery department in a sulphate mill will reveal corrosion where moisture is apt to accumulate and mix with the alkali that floats through the air. This condition is particularly noticed on metal sash, as will be discussed later. Proper treatment at the time of erection will eliminate most of the trouble in this department, while maintenance of the structure in operation calls for proper cleaning and the right type of paints.

Blow Pits and Acid Manufacturing Department

Our inspection takes us on the blow pit and the acid manufacturing department. Piping, structural steel, machinery all give much trouble and cannot be painted properly unless they are thoroughly cleaned and dry at the time of painting.

Wet Room, Beater Room, Screen Room

Wet room, beater room, and screen room are next looked over. Here we will find corrosion of piping, structural steel, metal sash, electric conduit, and machinery. The basement beneath these rooms seems to be the greatest offender. Variations in temperature, condensation on cold water piping, wet pulp, slopping of water are all factors that produce this condition. Our electric flash will reveal corrosion in corners and in places hard to get to. Outlet boxes of the electric system should be looked at carefully and instructions should be given to the painters to see that these surfaces are thoroughly cleaned and painted if they can be properly dried. Frequently it is impossible to obtain dry surfaces to work upon. It would be necessary to shut down the plant for several days which would bring protests from the owners, sales department, employees, and customers. Still these surfaces must be maintained and cleaning is still the main factor to be considered. Special treatment under such conditions must be resorted to.

Machine Rooms

Machine rooms demand our attention now. The basement should be given the same careful consideration. Our electric flash and steel scraper will reveal much that is not to be desired in places not readily accessible. These surfaces will be found neglected and possibly a protest will be heard from the painter when proper care is demanded. Piping, electric conduit, structural steel particularly at joints and points of contact with masonry should be investigated.

The machine room proper is an interesting place to consider. The humidity of the room as a rule governs the amount of corrosion taking place. Naturally, the ventilating system over the machines must be considered. The roof material, and the design or process of laying, govern the amount of condensation that takes place. Extreme variations in temperature must also be taken into account.

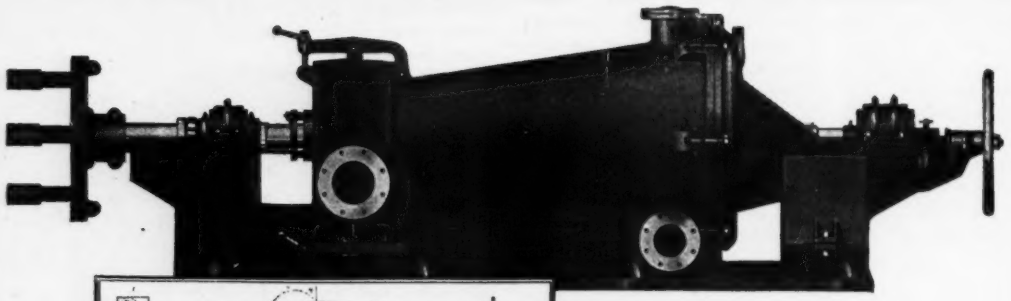
Structural steel over the wet ends of the machines usually shows much evidence of corrosion and these surfaces are very apt to be neglected for they can only be cleaned properly when the machines are shut down. But proper cleaning must be done. Machinery, particularly the frame of the wet end, shows considerable evidence of rust. Metal sash give much trouble. This is due to accumulation of water during the winter and improper treatment at the time of installation.

Store Rooms, Machine Shops, Pulp Storage, Finishing Room

Store rooms, machine shops, pulp storage, finishing room must all be considered. Space does not permit specific discussion in each case. The point that has been emphasized during this brief discussion is that thoroughness of inspection must be employed; painters and foremen in charge of such work must understand that they control property worth a great deal of money and that the value of that property will be enhanced greatly by care taken in maintenance.

The usual practice of shutting down a plant Saturday noon and turning a crew loose with instructions to paint and have it finished by Sunday night usually results in just that thing. Such a practice is an unwise one and a waste of time, labor, and material for the main object of the crew will be to get the paint on.

Men who have been trained in painting should be used; a foreman should be selected who understands cleaning methods and the necessity for proper cleaning as well as the necessity for the use of proper paints. Steel scrapers, chip hammers, pneumatic scaling hammers and sand blast can be used. Steel wire brushes should always be employed after the scale has been removed in order to clean the surface of surface rust. Every particle of scale, no matter how tightly adhered, should be removed from the surface. Corrosive scale contains approximately 24 per cent of hydroscopic moisture which will be a foci for further corrosive action unless it is removed. Obviously improper cleaning is therefore a very expensive operation and too great an emphasis can-



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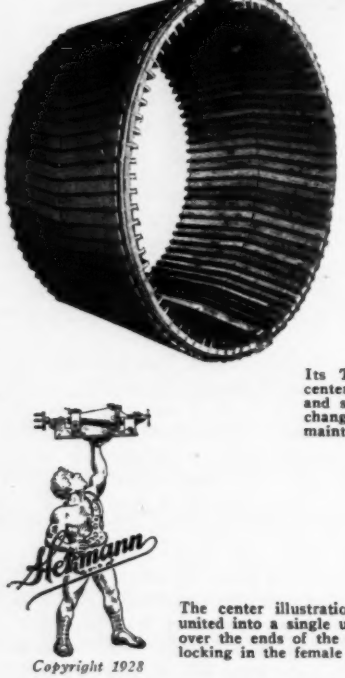

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Assembly of Shell Filling Is Exclusive and Important

The center illustration suggests how the several parts of the shell filling are united into a single unit—(one solid mass.) Observe how the tension bar passes over the ends of the oak separators and through slots in the knives, and finally locking in the female triangle number one. A bulletin outlining this construction in detail is available upon request.

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not be placed upon the cleaning process and the proper supervision during the cleaning operation.

Every paint manufacturer will always insist on dry surfaces before the paint is applied. It is true some over-zealous salesmen have claimed that a particular material can be applied to a wet surface. However, the very nature of a paint film prevents this. Adherence to steel surfaces is one of the important factors to successful painting and if a film of moisture, grease, oil or anything that does not dry is interposed between the paint film and the steel surface, peeling will result and corrosion will follow.

Two types of paints are used in the protection of steel and iron surfaces; first, a priming coat; second, finish coats.

The function of a good metal primer is to protect the metal against the action of corrosion. It must be tough, yet flexible and it must contain the pigments that are electrochemically insulating. Among these are red lead, blue lead, chromate of lead, and sulphate of lead.

The field coat should be a paint that will protect the priming coat against the action of the elements for it is almost impossible to incorporate in one material such ingredients as will insulate against the electrolysis and afford protection against the elements as well.

At the fore part of this paper reference was made to the proper treatment of steel or iron surfaces in the fabricating plant to protect that surface against corrosive action of blue mill scale. Two methods can be used to remove this objectionable scale, namely: pickling and exposure to the elements. Speed of production and cost of operation prevent the use of these two methods. The only method remaining, therefore, is to paint these surfaces before the structure has been exposed to the elements in any way. The engineer should see that this procedure is followed in the fabricating shop.

The same type of primer used for new construction should be used for repainting and under severe conditions, two coats should be used. The second coat, however, should be tinted to a different shade than the preceding coat to insure covering by the painter.

New construction should receive an intermediate coat of paint—of different color than primer yet possessing all the properties of a good primer to insure proper coverage of bolt heads, rivet heads, abrasions, etc.

The various types of exposure found in a paper mill make this subject one of vital importance. As pointed out above, the field coats are designed to protect the priming coat against the action of the elements. These coupled with chemicals act as active destroyers of paint structure. The field coats must contain liquids that do not oxidize readily and still must be flexible to withstand expansion and contraction due to atmospheric changes. The pigments should be inert to the action of the prevalent chemicals in a paper mill.

There are several types: Asphalt base paints that have been properly treated are very fine materials to use in the acid plants, under water construction, alternate under water and air exposure. little or no effort, during the manufacture of these paints, has been made to remove the sulphur content and since sulphur has a marked affinity for hydrogen, corrosive action will therefore take place beneath such a film almost as rapidly as it would if untreated. Still, it is a good paint for the purposes mentioned, but it should never be applied directly to metal under any consideration. When used over one or two coats of a good primer which has been allowed to dry hard, such a paint will afford excellent protection under severe conditions.

Linseed oil paints containing basic pigments such as carbon, graphite, iron oxide, and sulphate of lead afford protection but they will not stand up under severe conditions.

Frequently the owner demands a color scheme for a plant. Some care should be used in selecting shades, for many are soluable in dilute sulphuric acid. Shades of green, some reds, all chrome yellows or any combination of colors used to arrive at a particular shade containing these pigments will prove more or less disastrous.

Mention has been made of the treatment of surfaces that cannot be dried. A manufacturer of paint or a paint salesman will do well to recognize that this condition exists and make his recommendations accordingly. Paper mills cannot be shut down and protection is highly desirable.

If a material of a non-drying nature such as a petroleum wax can be mixed with a chromate salt and applied to these surfaces protection will be afforded. This is being done commercially, the manufacturers advising that the material be applied to a comparatively clean surface from which as much of the surface water as possible has been removed. The wax is to be rubbed on to the surface until the water left thereon has emulsified with the wax. In three or four months the scale not removed will drop from the surface. When this is noted the surface should again be cleaned and re-treated with the wax. Two treatments usually suffice to protect the surface over quite a long period of time.

A number of objections have been raised to the use of this type of material. The principal one is that it does not dry and is tacky—it cannot be painted. Millwrights and steam-fitters particularly object to it. On the other hand, it is probably the only known method of protecting present installations that cannot be painted due to moisture conditions.

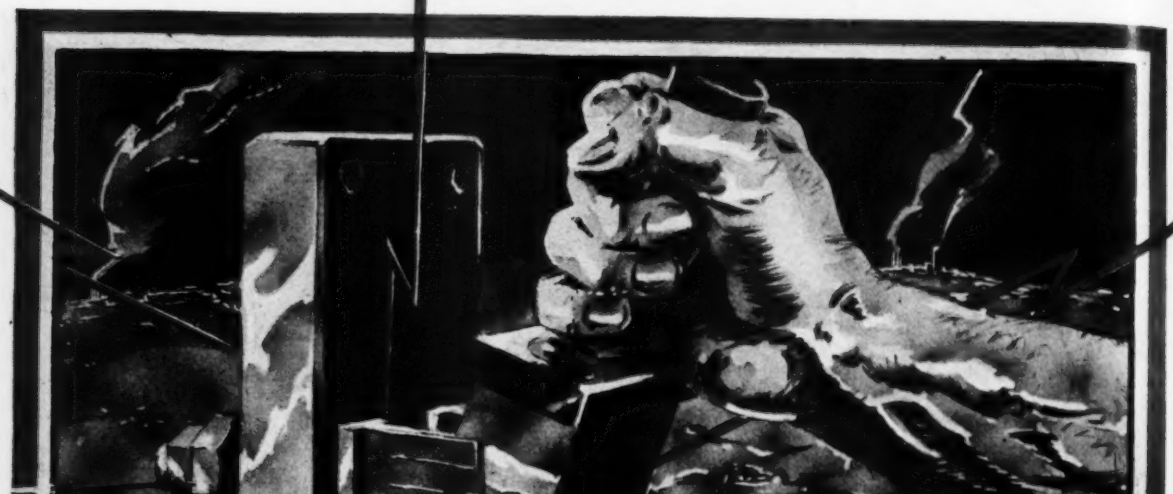
Your particular attention is called to the treatment of metal sash. Experiences of engineers and owners have been very unsatisfactory and replacement with wood sash and casings has been resorted to. Much of this trouble is due to the acid condition of the plant, accumulation of moisture in cracks and behind putty, the sustained moisture conditions during cold weather and the improper maintenance after it is installed.

The manufacturers of metal sash are the chief offenders in this matter. They buy the poorest grade of a metal primer that can be made, in fact it is not a primer but a wash or dip coat designed to give color and to last long enough to get the sash on the job. Such a paint will afford no protection and a good rain will wash it off. A paint structure is as strong as its foundation.

Bearing this in mind, the following recommendations are made. First, that the priming coat of paint on all metal sash shall be a good metal primer applied by hand brush and allowed to dry hard before shipping. If this cannot be done, the metal sash should be shipped to the job unpainted and on arrival should be thoroughly cleaned and given the first coat on the job. All surfaces that will come in contact with masonry should be given two coats of the primer and a final coat of a waterproofing material such as a good asphalt base paint. After setting, all exposed surfaces should be given another coat of the primer and after glazing, a finish coat of the material that has been adopted as a standard for the purpose should be used. Some engineers will point out that this is an expensive operation but it is unquestionably less expensive than the tearing out and replacement of sash in the course of five or six years.

Referance has been made to steel surfaces in concrete. Investigations showing the effect of corrosion of iron embedded in concrete have been conducted. The fact that numerous concrete structures built during the past ten years show unmistakeable signs of deterioration has caused much anxiety, and many investigations have been carried out to determine just what conditions may have caused the failure of the concrete. A recent investigation into the subject of corrosion resistance of painted iron has brought out some rather interesting facts.

The purposes of this investigation were to determine the amount of protection afforded iron embedded in concrete by paints of various kinds. For these experiments, iron bars ¼ inch in diameter and 8 inches long were thoroughly cleaned by sanding and pickling. They were then painted with various combinations of paints. When the paints were dry, these rods were placed in molds in an upright position and cement mortar, consisting of one part of cement



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and two parts sand, were poured around them and carefully tamped into place. One month was allowed for these specimens to age properly. They were then placed in cans containing a sufficient amount of water to surround the specimens within one-half inch of the top of the concrete and connection was made with the factory telephone circuit of 25 volts of direct current in such a way that each was subjected to the same voltage. In one-half of the specimens representing one or more of each type paint, any current passing would flow from the embedded iron through the concrete to the outside container and in the remaining specimens it would flow from the outside container through the concrete to the embedded iron. This method of connection is shown in the accompanying illustrations. The current was turned on for approximately eight hours per day for two weeks and at the end of this time the specimens were removed from the cans and by means of an Olsen testing machine, the bonding strength between each embedded bar and the concrete was determined. The following report covers the more important facts brought out by these experiments.

Specimens No. 6, 7, and 8 were unpainted iron bars which were included in the test to show the action which takes place when no protective coating is used on the embedded iron. No. 6 was not connected with the current and was simply intended to show the protection afforded embedded iron by concrete when no electrolysis takes place. Specimen No. 8 was connected so that the current flowed from the outside container through the concrete to the embedded iron bar. This specimen afforded no resistance to the flow of current and bubbles of hydrogen gas escaped from the surface of the iron at the top as soon as the connection was made. The accompanying illustrations show no corrosion took place on the iron, but a marked change in the appearance of the concrete around the iron bar was noticeable. Specimen No. 7 was connected so that the current flowed from the iron bar to the concrete. Electrolysis began as soon as the current was turned on and proceeded so rapidly that at the end of 28 hours the specimen cracked open from the pressure of the corrosion formed. These three specimens show what may take place when no protective coating is used.

FIG. 1

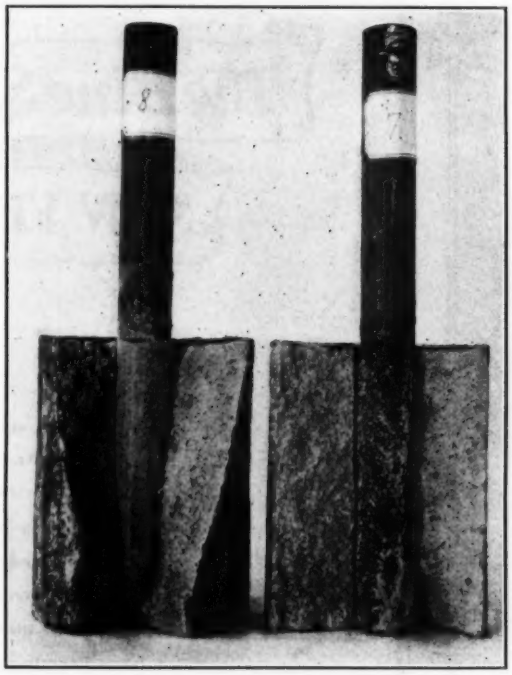

FIG. 2

Specimens No. 3 and 9. The iron bar in specimen No. 3 was painted with three coats of an ordinary linseed oil paint and was not connected with the electric current. When the specimen was cracked open at the end of the experiments, the paint film on that part of the bar embedded in the concrete was found to be entirely destroyed from the action of the alkali present. Specimen No. 9 was painted with three coats of the same oil paint and was connected in such a way that the current flowed from the embedded iron to the concrete. The alkali in the concrete undoubtedly destroyed the paint film entirely during the aging of the specimen because the current passed through as soon as the connection was made, and excessive corrosion took place. The condition of the specimens at the end of the experiment is shown in the accompanying illustrations. These two specimens show what may take place when only an ordinary oil paint is used on iron embedded in concrete.

Specimen No. 13 was painted with two coats of linseed oil paint and one coat of a high grade coal tar. Connection was made in such a way that the current would flow from the iron to the concrete, but the insulating properties of the coal tar were so great that no current passed at the end of the experiment. The embedded iron bar showed no corrosion whatever. While this paint showed fairly satisfactory results, the principal objection to its use is the fact that coal tar has a marked tendency to soften a linseed oil paint and there is always a possibility of a considerable portion of the protective coating being removed by abrasions during the pouring of the concrete.

Specimen No. 5 is selected as being typical of the results obtained from seven combinations where a specially treated bituminous paint is used as a final coating. None of the specimens on which this type of paint was used passed any current during the entire test and no corrosion took place on any of the embedded bars. Illustrations of specimen No. 5 show the excellent condition of the paint on the bars when the block was split open at the end of the experiment. A part of the paint film was removed to show the perfect condition of the underlying metal.

As a result of the bonding test made on the specimens specially treated with bituminous paint as a final coating, the bonding

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At last I am grown to my full stature ▲ ▲ ▲ ▲ Many battles with wintry gales have given to my long, sinewy fibres the *strength of the North.* Now I am ready to take my place in the world of men ▲ ▲ ▲ I am resolved this very year to go to the mill ▲ ▲ ▲ But not to a *wasteful* mill. Not for me the haphazard methods that lay waste the forests of our land. Mother Nature made me an economic structure—and I shall go to an economic mill! ▲ ▲ ▲ I am resolved to serve the greatest possible number of people—in the largest possible number of ways ▲ ▲ ▲ My character and my strength shall be embodied in products of which the world of business will be proud—honestly and skilfully made, dependable and sure —*PAPER!* ▲ ▲ ▲ To this end, I welcome the ringing, biting axe that lays me low, and make my way joyfully to the famous Mills of Mosinee, singing as I go,

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strength between the concrete and the embedded bar was practically twice that of specimens where only linseed oil paint was used. Whenever electrolysis takes place, the bond between the concrete and the embedded iron will vary from its normal value to practically nothing at all, depending upon the amount of current which passed and length of time the action took place.

The above investigations have established the following facts:

First: When an electric current flows from an embedded iron to concrete, corrosion of the iron is bound to result. Moreover, the iron rust formed by the corrosion occupies a volume of two and two tenths times as great as that of the original iron and the pressure resulting from this increase in volume is sufficient to cause the concrete to crack open. This pressure has been actually measured in a number of cases and has been found to reach values as high as 4700 pounds per square inch, which is more than sufficient to crack the strongest forms of concrete.

Second: When an electric current flows from the concrete to the embedded iron, no corrosion takes place, but there is a softening of the concrete around the iron, which in time may result in a complete destruction of the bond between the concrete and the reinforcing material. This action takes place even if a small amount of current flows and the result may be more serious than the splitting of concrete, which takes place when the current flows from the iron into the concrete.

It will be seen, therefore, that although alkali in cement is sufficient to prevent the ordinary rusting of iron due to segregated impurities, yet the rapid corrosion of iron embedded in concrete will take place when direct currents enter a concrete structure from direct contact with light and power circuits, through contact with water or gas pipes carrying direct currents from grounded power lines, through defective insulation of electric wires or from similar sources. Authentic reports of serious damage to reinforced concrete structures by electrolysis are frequently reported by the technical press and several methods have been suggested for the overcoming of the trouble since the moisture in concrete will act as a conductor of current between the electrolytes that form corrosion.

Attempts have been made to render concrete a nonconductor by the use of certain waterproofing compounds, which are added to the cement when mixing. On the whole, such methods have been shown to be of little value while coating iron with an insulating paint before it is placed in the concrete has proven to be the only efficient method which is of any practical value. In order to afford protection under such conditions, a paint coating must possess the following fundamental properties:

It must be waterproof; it must be a perfect insulator; it must be unaffected by alkali contained in the cement; and it must be of a nature that will form an effective bond with the concrete.

FIG. 4

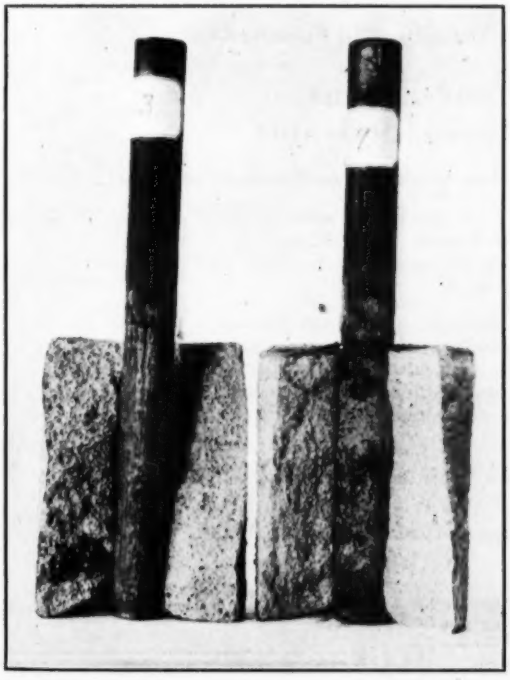


FIG. 3

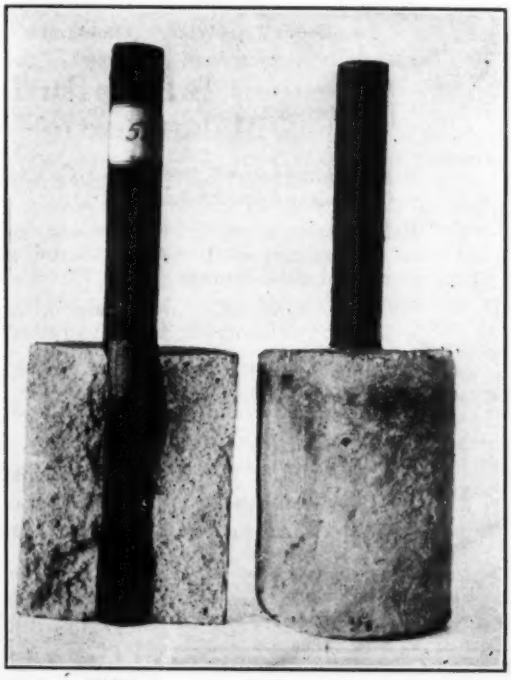
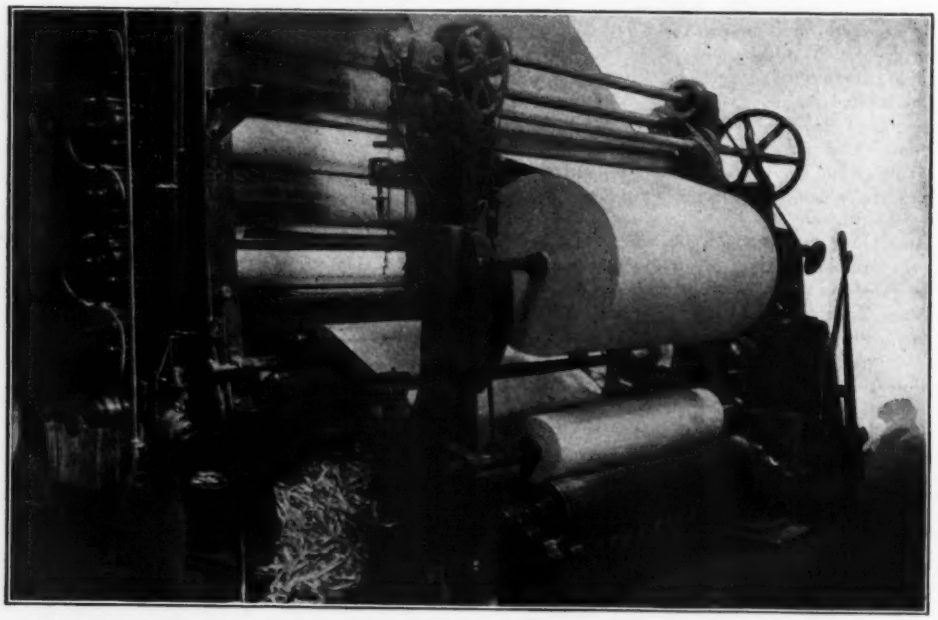


FIG. 5

"M & W" Drum Winders for Super-Calenders

PERMITS FASTER SPEED FOR CALENDERING

Shipping Rolls are made direct from Supers without rewinding the Rolls



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Winders equipped with automatic tension regulation to eliminate paper breaking between calender and winder . . . and to regulate the hardness of rolls to be wound.

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Patents Pending for Recent Improvements to "M & W" Drum Winders

Comparison of Grinder Types*

By Keith Gainer [1]

Previous to the advent of the large, high speed paper machine, the pocket type of grinder had been sufficient to cope with the problem of supplying the necessary quantity of groundwood pulp used in the manufacturing of paper, especially the news print grades. The increase in capacity of the modern paper machine and the keen competition between the various mills soon showed that a large capacity, low cost pulp producing unit was also needed. This led to the introduction of the magazine type of grinder having hydraulic pistons very similar to the pocket type. The chain-feed, continuous type of grinder was next introduced. This grinder dispensed with hydraulic pistons altogether, having one large pocket directly over the top of the stone and using two chains on each side of the grinder to press the wood against the face of the stone.

The purpose of this article is to make a comparison of the three types of grinders principally on a pulp cost per ton basis. The data that will be given are from operating records and tests of the three types. The figures in some cases are averages obtained over a nine month period, others are for a four month period. As this is primarily a cost comparison, all wordy details will be omitted.

Actual dollars and cents will not be given. Percentages will be used which will show, it is believed, in a much better way, the advantages of one type of grinder as compared with the others. The costs per ton for various items as obtained from a record of chain-feed grinders will be equal to 100 per cent. The others will be higher or lower percentages of this as the case may be. It will be a simple matter to compare these figures with the wood grinding costs in any mill, by using the ratios indicated in this report.

Percentage Item Costs for Grinder Types

The following itemized account makes a comparison of the principal items entering the cost of groundwood pulp. It is not complete, but will be sufficient for the purpose of this report.

	Chain [2]	Hydraulic magazine [3]	Pocket [4]
Grinding labor	100	71.33	101.00
Wood handling	100	75.00	125.00
Maintenance labor	100	200.00	128.50
Maintenance materials	100	88.80	94.40
Grindstones	100	66.60	20.40
Burrs	100	50.00	24.20
Lubricants	100	16.66	41.66
Electric power	100	96.44	114.25
Production per grinder	100	137.15	62.30
Total cost per ton	100	90.59	104.04
Total cost per ton exclusive of wood preparing cost	100	81.64	87.30

[2] Warren grinder, using four-foot wood.
[3] Voith grinder, using four-foot wood.
[4] Two-foot wood used.

Labor Costs

Grinding labor is, of course, higher on the pocket grinders than on either of the other types. This is naturally to be expected with this type because of the low tonnage produced per unit and the small number of units it is possible for one man to take care of properly. Wood-handling labor is higher for the same reason. Maintenance labor is higher on both the magazine and the pocket grinders, than it is on the chain-feed type. This may be accounted for by the fact that the chain-feed grinders have been installed for about two years, while the others have been in use for about six years. It is to be expected that the older grinders will have a higher maintenance cost.

Maintenance Materials and Stones

Maintenance materials on the pocket and magazine grinders, however, cost less than for the chain-feed type. The reason for this is, I believe, because the largest part of the repair work on the magazine and pocket grinders is for repacking cylinders, valves, etc. Repairs to the chain-feed grinders, while less frequently made, are usually more serious. A broken stone in the chain-feed type will quite often break the front of the grinder. This rarely happens in the magazine grinder, although it is quite likely to occur with the pocket type. Grindstones, which are one of the largest items in groundwood costs, exclusive of wood, power and labor, show a very marked decrease in the magazine grinder and a still more marked decrease in the pocket grinder. This is due to the increased grinder pressure per square inch in the chain-feed type and also to the difficulty in knowing whether the wood is jammed in the magazine or not. This jamming is likely to cause the load to vary and may result in one stone carrying too great an overload which is likely to cause the stone to break. The difference in first cost of the 54 inch stones and the 27 inch stones partly accounts for the greatly decreased stone cost on the pocket grinders.

Burrs and Lubricants

Burr costs show a very great decrease in the magazine and pocket types from the chain-feed grinder. One reason for this is the high grinding pressure in these particular chain-feed grinders. This tends to wear the face of the stone away very rapidly, resulting in a decrease in production as well as quality of fiber. The stone must then be sharpened in order to restore the proper face and to obtain the desired quantity and quality of fiber.

Lubricant costs are also lower for the magazine and pocket grinders, than for the chain-feed type. This is due partly to the different systems of bearing lubrication in use. Oil rings are used on the hydraulic magazine, and a continuous circulating system on the chain-feed. There is also an evident difference in bearing pressure because in the chain-feed grinder, the pressure is all exerted downward, while in the magazine type it is at more of an angle from the side and on the pocket grinder it is from the sides and top. The greasing of the chains on the chain-feed grinder may also account for some of the difference.

Power, Production and Overall Costs

The comparison of electric power used on the chain-feed and the magazine grinders is quite accurate. The same cost per horsepower month applies to each. A different and higher cost is used on the pocket grinder, however, which is one reason that the pocket grinders show a higher cost than either of the others. The figures showing the production per grinder serve to explain the cost figures. The small grinding area on the chain-feed grinders makes it impossible to put a heavy load on the stone because of the abnormally high stone cost which is sure to result. The figures on the total cost per ton are a good comparison between the magazine and chain-feed grinders as the prepared wood cost, per ton of stock, is the same for both. The wood cost for the pocket grinders is slightly higher, however, which tends to bring the percentage of total cost for this type, up quite markedly. The figures showing the relationship of total costs minus wood costs for each of the three types give a better indication of the costs. The horsepower used per ton will average about the same for the pocket and magazine grinders, but will run slightly higher on the chain-feed.

Pulp Quality

The stock produced on the pocket grinder is generally agreed to be better and there is less waste, than that produced on either the chain-feed or magazine type. Stock produced on the magazine grinder is considered to be somewhat better than that produced by the chain-feed grinder. This is probably because of

* Presented at Annual Meeting of TAPPI, New York, Feb. 21, 1929.
[1] Junior Member TAPPI; International Paper Co., Three Rivers, Quebec.

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the difference in grinding pressure. It is true, of course, that the stone, wood, grinding pressure and electric load used will affect the quality of the stock produced, but in the ones I am using as illustrations each of these factors has been changed where possible, each time with about the same result. A change in grinding pressure on the chain-feed grinders, from a high to a lower pressure should result in an increase in fiber quality. The peripheral speed of the chain-feed grinders is greater than in the others. The kilowatt load per line also averages less but the horsepower used per ton is greater.

Grinding Area

It is necessary to remember that there is a great difference in the grinding area of each of the two types of magazine grinders, and also in the grinding pressure per square inch of grinding surface.

The chain-feed grinders used in this comparison have a magazine width of approximately thirty inches. The grinding pressure is between thirty-seven and seventy-four pounds per square inch. An average figure would be about fifty pounds per square inch.

The hydraulic magazine grinders have two pockets, each of which has an area almost equal to the grinding area of the Warren grinders. It is thus possible to have a lower grinding pressure and still obtain high production. The grinding pressure on the Voith grinder is between seventeen and thirty-four pounds per square inch. An average figure is about twenty-five pounds per square inch.

This great difference in grinding pressure and area is the reason, I believe, for the higher cost per ton on the chain-feed grinders.

Figures from a mill using these grinders, but with slightly larger magazines and consequently increased grinding area, show costs a trifle lower than those I have quoted, although they are still higher than the pocket or the hydraulic magazine types.

It is possible that if a change were made in the magazines of these grinders so that the grinding area of the two types was about the same, the costs per ton for each type would be more nearly alike.

Pulp Stone Grit in Mechanical Pulp*

By Edwin A. Riley[1]

At the present time mechanical or ground wood pulp is entering a new field. With the adding of mechanical pulp to the known pulps a new era of paper production was started. This new pulp became the body for newsprint. As this field became flooded by the tremendous production that followed, the buyers became more critical. Then began an increasing demand for better paper. While attempting the betterment of mechanical pulp to meet this new condition it was found that this so called "cheap pulp" had entered with some success into the production of better grades of paper. Upon this entrance ground wood became heir to the major ills of the better grades of pulp, these are quality and cleanliness. The quality of pulp needed has been attained to a large degree. This was accomplished mainly by varying the type of stone, kind of burr used and the method of use.

The attempts to make a cleaner pulp have met with great opposition. This has been due to the many factors contributing to the result. Without a doubt the larger part of dirt found in groundwood or caused by groundwood in the sheet comes from the wood itself. A few that might be mentioned are; bark, shives, pitch, discolored fiber and trapped mud. A large percentage of the above mentioned items can be eliminated by careful operation in the process. The grade of pulp desired should determine the rigidity of the wood cleaning process; this should be true both in the wood room and the screening after the grinding.

A great deal of sediment can be injected into the pulp by the unwise use of fresh water. Nearly all mills take their fresh water from the nearby river. Careful screening will no doubt stop a large part of this sediment from entering the stock. The best manner, it seems, to keep this dirt down to a minimum would be the careful use of fresh water as "make-up" water.

In addition to the dirt already mentioned, is the gritty substance obtained from the grind-stone during the grinding process. As the grinding proceeds the stone will wear away; this will be either rapid or slow according to the conditions of grinding. There are two distinct causes of wear of a pulp stone; one the natural wearing due to the grinding of the wood and the other by replacing the pattern by means of the burr. The loss during the natural grinding may exceed that taken off by the action of burring. The particles however from the burring would tend to be more jagged and of greater size.

Stone grit may enter the pulp in approximately two classes. The first class and the one that would tend to cause trouble in the paper is composed of the crystalline particles; second the fine material or bonding cement.

For purposes of estimating the amount of grit from grindstones that might find its way into finished pulp, production per stone and weight of stone lost was determined for a number of stones. The following tabulation shows what this amounts to for nine different stones representing several common makes.

TABLE 1

No. stone	Tons pulp produced	Lbs. stone lost (per ton pulp)
1	809	2.73
2	1,025	2.16
3	1,254	1.57
4	918	2.15
5	532	3.92
6	898	2.29
7	1,085	1.95
8	413	5.50
9	663	3.53

The following tabulation shows the monthly rate of pounds of stone lost per ton of pulp for two stones. These figures were obtained from monthly calipers of the stones, and tonnage produced.

TABLE 2

Stone A	Stone B
0.43	3.17
2.65	2.77
1.04	2.88
0.32	2.25
2.30	0.81
3.59	2.53
0.39	0.45
1.27	2.73
3.89	...

After determining the amount of grit that is put into the pulp the question of elimination is the next in order. Some grit is lost with the tailings and some settles out in "dead" places and removed by the "wash-up." Many mills use "rifflers," much dirt including the grit is collected in this way and can be removed by washing. Care both in design and operation is needed to get a maximum result. The area of cross-section must be such that a low velocity of travel is given the pulp. To function with a positive degree of success duplicate rifflers must be used, while one is in operation the other to be cleaned. It has been found that after a short time a riffler becomes slimed over, causing the passage of further dirt into the system.

A method recently suggested by one who is interested in the stone phase, is the removal of the grit at the time of burring. It is felt that this suggestion is of great merit. Experiments are to be made from this point of view. It is thought that by proper designing, this method can be accomplished with success.

* Presented at Annual Meeting of TAPPI, New York, Feb. 21, 1929.

[1] Member TAPPI; Supt., Topsham Mill, Pejepscot Paper Company, Brunswick, Maine.

A. P. W.

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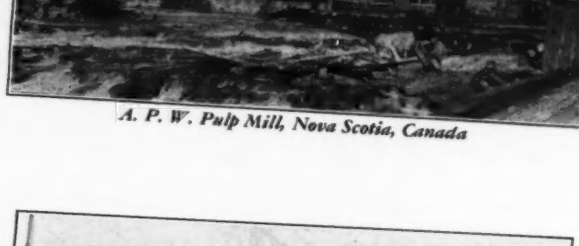

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Bibliography of Papermaking for 1928

Committee on Abstracts and Bibliography, Contribution No. 51

By Clarence J. West, Chairman

The year 1928 has seen the appearance of a number of books of particular interest to the Technical Association. Probably the most important from a bibliographical point of view is the Bibliography of Paper Making, 1900-1928. This book of 980 pages contains a fairly complete index of the literature of paper making for the past twenty-eight years. It is classified under 154 subject headings, many of which are further sub-divided. The index enables the location of any particular sub-division. Supplementing this, there is the second edition of Paper Making Materials, which brings the literature on this subject up to the first part of 1928.

The Vocational Committee is making good progress on the revision of the three volumes relating directly to paper making. Volume 4 was published during the past year, and work on Volume 5 is well under way.

The other books which have appeared will be found listed under their appropriate headings in the bibliography which follows.

A new magazine, Technologie und Chemie der Papier- u. Zellstoff-Fabrikation; Chemische-technische und wissenschaftliche Beilage zu der Zeitschrift Wochenblatt für Papierfabrikation (supplement to the Wochenblatt), was started in 1928. While the volume number is 25, it really is a new magazine. It contains technical articles similar to those found in Cellulosechemie, the supplement to Papierfabrikant. It also contains abstracts of articles on cellulose and paper making.

This year an effort has been made to include more references to the abstract journals. The following designations are used: "T. S.," for the Technical Section appearing in the PAPER TRADE JOURNAL; "C. A.," for Chemical Abstracts; "B. C. A.," for the British Chemical Abstracts, which are designated as sections A and B, section A relating to pure chemistry, and section B to applied chemistry; "P. P. M. C.," to the abstracts appearing in the Pulp and Paper Magazine of Canada. It is believed that these will materially increase the value of the bibliography to those men who do not have access to the original publications.

List of Journals Covered

For more complete information about most of the following journals, as well as a list of the libraries in the United States and Canada in which they are currently received, see the List of Periodicals abstracted by Chemical Abstracts with Key to Library Files, published by Chemical Abstracts in 1926.

ANNALEN DER CHEMIE, JUSTUS LIEBIG'S. Verlag Chemie, G. m. b. H., Leipzig, Germany.

ANNALI DI CHIMICA APPLICATA. Via Quattro Novembre, 154 Rome, Italy.

APPARATEBAU, DER. Verlag von W. Klenke, Volkswirt, R. D. V., Hanover, Germany.

BERICHTE DER DEUTSCHEN CHEMISCHEN GESELLSCHAFT. Berlin, Germany.

BIOCHEMICAL JOURNAL. Cambridge University Press, London, E. C. 4, England.

BOLLETTINO R. STAZIONE SPERIMENTALE PER L'INDUSTRIA DELLA CARTA E LO STUDIO DELLE FIBRE TESSILI VEGETALI. Milan, Italy.

BRENSTOFF-CHEMIE. Verlag von W. Girardet, Essen, Germany.

BRICK AND CLAY RECORD, Industrial Publications, Inc., 407 S. Dearborn St., Chicago, Ill.

BRITISH CHEMICAL ABSTRACTS. Central House, 46 Finsbury Sq., London, E. C. 2, England.

BULLETIN DE LA SOCIÉTÉ DE CHIMIE BIOLOGIQUE. Masson et Cie, 120 Blvd. St. Germain, Paris (6e) France.

BULLETIN DE LA SOCIÉTÉ D'ENCOURAGEMENT POUR L'INDUSTRIE NATIONALE. 44 rue de Rennes, Paris (6e) France.

BULLETIN OF THE IMPERIAL INSTITUTE. The Imperial Institute, London, S. W. 7, England.

BUMAZHNAYA PROMUISHLENNOST (Paper Industry). Printed in Russian. Moscow, Union of the Socialistic Soviet Government.

CANADIAN CHEMISTRY AND METALLURGY. Toronto, Canada.

CANADIAN ENGINEER. Monetary Times Print. Co. of Canada, Ltd., 62 Church St., Toronto, Canada.

CANADIAN MACHINERY AND MANUFACTURING NEWS. Toronto.

CANADIAN MINING JOURNAL. The Industrial and Educational Publishing Co., Ltd., Garden City Press, Gardenvale, P. Q., Canada.

CAOUTCHOUC ET LA GUTTA-PERCHA. A. D. Cillard, Paris, France.

CELLULOSE INDUSTRY (JOURNAL OF THE CELLULOSE INSTITUTE, TOKYO). Printed in Japanese with English and German summaries. Mitsubishi Paper Mills, Ltd., Hongo-Ku, Tokyo, Japan.

CELLULOSCHEMIE. Supplement to the Papier-Fabrikant.

CHEMICAL ABSTRACTS. American Chemical Society, Washington, D. C.

CHEMICAL AND METALLURGICAL ENGINEERING. McGraw-Hill Company, Inc., New York City.

CHEMICAL REVIEWS. Williams and Wilkins Co., Mt. Royal and Guilford Aves., Baltimore, Md.

CHEMICALS. 51 Vesey St., New York City.

CHEMIST-ANALYST. J. T. Baker Chemical Co., Phillipsburg, N. J.

CHEMIKER-ZEITUNG. Walter Roth, Göthen, Germany.

CHIMIE ET INDUSTRIE. Société de Chimie Industrielle, Paris, France.

COMPTES RENDUS HEBDOMADIRES DES SÉANCES DE L'ACADÉMIE DES SCIENCES. Gauthier-Villars et Cie, 55 Quai des Grands-Augustins, Paris (6e) France.

CUIR TECHNIQUE. U. J. Thuau, 54 rue de Bondy, Paris, France.

DYESTUFFS. National Aniline and Chemical Co., New York City.

ELECTICAL JOURNAL. East Pittsburgh, Pa.

ELECTRICAL WORLD. McGraw-Hill Book Co., Inc., 10th Ave. at 36th St., New York City.

ENGINEER. 33 Norfolk St., Strand, London, W. C. 2, England.

ENGINEERING JOURNAL. The Engineering Institute of Canada, 176 Mansfield St., Montreal, Que., Canada.

ENGINEERING NEWS-RECORD. McGraw-Hill Co., Inc., 10th Ave. at 36th St., New York City.

FARBE UND LACK. Baringstr. 4, Hannover, Germany.

FUEL IN SCIENCE AND PRACTICE. Colliery Guardian Co., Ltd., 30 and 31 Furnival St., Holborn, London, E. C. 4, England.

HALLE AUX CUIRS. 36 rue Debelleyme, Paris (3e) France.

INDIA RUBBER WORLD. New York City.

INDUSTRIA DELLA CARTA E DELLA ARTI GRAFICHE, L'. Via Zebedia 3, Milan, Italy.

INDUSTRIAL AND ENGINEERING CHEMISTRY. Mills Building, Washington, D. C.

INDUSTRIAL CHEMIST AND CHEMICAL MANUFACTURE. Westminster, London, England.

INDUSTRIE PAPETERIE. Grenoble, France.

INLAND PRINTER. Chicago, Ill.

JOURNAL OF CHEMICAL INDUSTRY (Russia). B. Lubyanka 6, Moscow, Union of the Socialistic Soviet Empire.

JOURNAL OF THE AMERICAN CHEMICAL SOCIETY. Charles L. Parsons, Secty., Mills Bldg., Washington, D. C.

JOURNAL OF THE CHEMICAL SOCIETY (London). Burlington House, London, W. 1, England.

JOURNAL OF THE COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH. Melbourne, Australia.

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JOURNAL OF THE SOCIETY OF CHEMICAL INDUSTRY. London, E. C. 2, England.

JOURNAL OF THE SOCIETY OF CHEMICAL INDUSTRY, Japan. Kogyo Kwagekukwai, Care Dept. of Applied Chemistry, Faculty of Engineering, Tokyo Imperial University, Hong-Ku, Tokyo, Japan.

JOURNAL OF THE SOCIETY OF DYERS AND COLOURISTS. Pearl assurance Buildings, Bradford, England.

JOURNAL OF THE TEXTILE INSTITUTE. Manchester, England.

KOLLOID-ZEITSCHRIFT. Theodor Steinkopff, Residenzstr. 12b, Dresden-Blasewitz, Germany.

KUNSTSEIDE. H. Jentgen, Drakestr. 45, Berlin-Lichterfelde W., Germany.

KUNSTSTOFFE. Munich, Germany.

METALLBÖRSE, DIE. Dr. Joachim Stern, Berlin, W. 35, Germany.

MONITEUR DE LA PAPETERIE BELGIQUE. 42 rue J.-B. Meunier, Brussels.

MONITEUR DE LA PAPETERIE FRANCAISE. 154 Blvd. Haussmann, Paris, France.

NATURWISSENSCHAFTEN, DIE. Julius Springer, Link-Str. 23/24, Berlin, W. 9, Germany.

NOTIZARIO CHEMICO INDUSTRIALE, IL. Turin, Italy.

PAPER INDUSTRY. 356 Monadnock Building, Chicago, Illinois.

PAPER MAKER AND BRITISH PAPER TRADE JOURNAL. 47 Cannon St., London, E. C. 4, England.

PAPER MAKERS' MONTHLY JOURNAL. Marchant Singer & Co., London, E. C. 3, England.

PAPER MAKING. 1 Mitre Court, Fleet St., London, E. C. 4, England.

PAPER MILL. 154 Nassau Street, New York City.

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PAPETERIE. L'Homme et Argy, Paris, France.

PAPIER. Edouard Henry, Paris, France.

PAPIER-FABRIKANT. Otto Elsner, Berlin, Germany.

PAPIER-ZEITUNG. Berlin S. W., 11, Germany.

PAPIR-JOURNALEN. Papirindustriens Hus, Huitfeldtsgt. 1, Oslo, Norway.

PAPPERS- OCH TRAVARUTIDSKRIFT FOR FINLAND; SUOMEN PAPERIJA PUUTAVARALEHTI. (The Finnish Paper and Timber Journal). Helsingfors, Finland.

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REVUE GÉNERALE DES COLLOIDES ET DE LEURS APPLICATIONS INDUSTRIELLES 9 rue Coetlogon, Paris (6e) France.

REVUE GÉNERALE DES MATIERES PLASTIQUES. 29 rue Turgot, Paris, France.

SIEMENS-ZEITSCHRIFT. Siemens-Schuckertwerke. Berlin-Siemensstadt, Germany.

SUPER-CALENDER. Pusey and Jones Co., Wilmington, Del.

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TECHNICAL ASSOCIATION PAPERS. TAPPI, New York City.

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TECHNOLOGIE UND CHEMIE DER PAPIER- U. ZELLSTOFF-FABRIKATION CHEMISCHE-TECHNISCHE UND WISSENSCHAFTLICHE BEILAGE ZU DER ZEITSCHRIFT WOCHENBLATT FÜR PAPIERFABRIKATION. Güntter-Staib Verlag, Biberach-Riss, Wurttemberg.

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ZEITSCHRIFT FÜR ANGEWANDTE CHEMIE. Verlag Chemie, Leipzig, Germany.

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ZELLSTOFF UND PAPIER, Verlag Carl Hoffmann, Berlin S. W. 11, Germany.

Classification

The papermaking literature of the year is arranged under the following topics:

- General
- Adhesives
- Analytical
- Associations
- Bamboo
- Barkers
- Bearings
- Beaters and beating
- Belts
- Bibliography
- Black liquor
- Bleaching
- Blotting paper
- Boards
- Cellulose
- Cellulose—Analytical
- Chlorine Process
- Clays
- Coated papers and coating materials
- Colloids
- Corn stalks
- Corrosion
- Costs and cost accounting
- Definitions
- Deinking
- Digesters
- Drying
- Durability
- Dyes
- Education
- Electric power in papermaking
- Employees
- Esparto
- Explosion process
- Felts
- Fillers
- Filter paper
- Filters
- History
- Hydrogen ion concentration
- Kraft paper
- Laboratories
- Lighting
- Lignin
- Logging
- Losses
- Lubrication
- Machinery
- Machines—Power requirement
- Mechanical handling
- Mechanical process
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  - Gloss
  - Humidity, effect of
  - Opacity
  - Porosity
  - Roofing felt
  - Strength
  - Thickness
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  - Steam power
    - Accumulators
  - Water power
  - Wood for fuel
- Printer and paper
- Pulp testing
  - General
  - Chlorine number
  - Color
  - Copper number
  - Freeness
  - Moisture
  - Strength
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- Pumps
- Rags
- Recording instruments
- Research
- Rod mill
- Rolls
- Safety
- Savealls
- Screens
- Sizing
- Slitters and rewinders
- Soda process
- Specialties
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General

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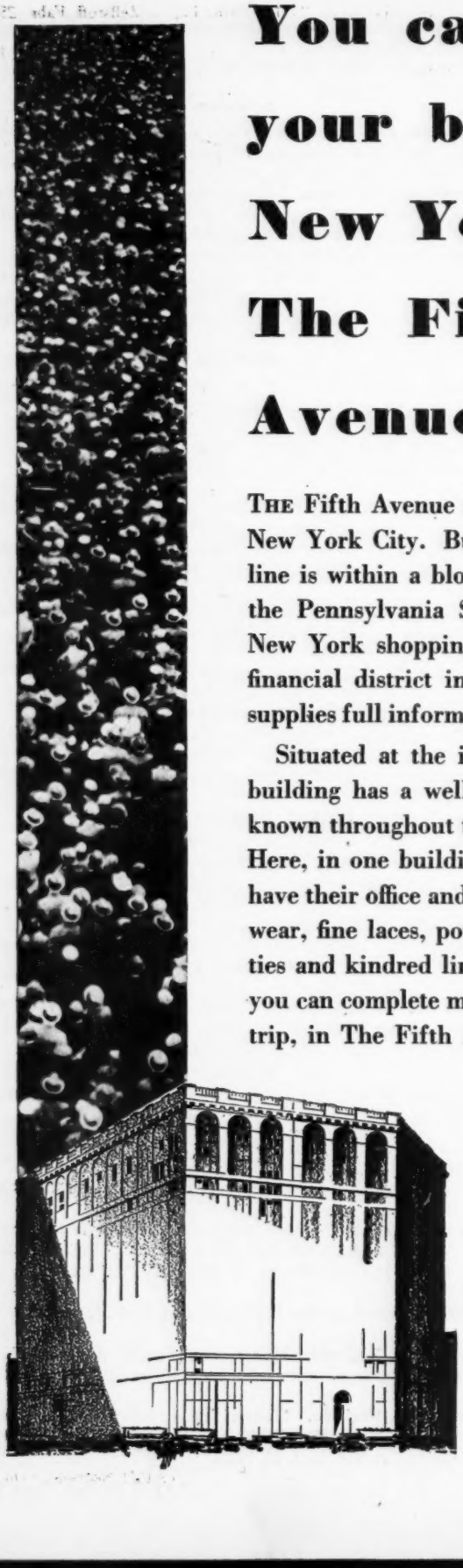

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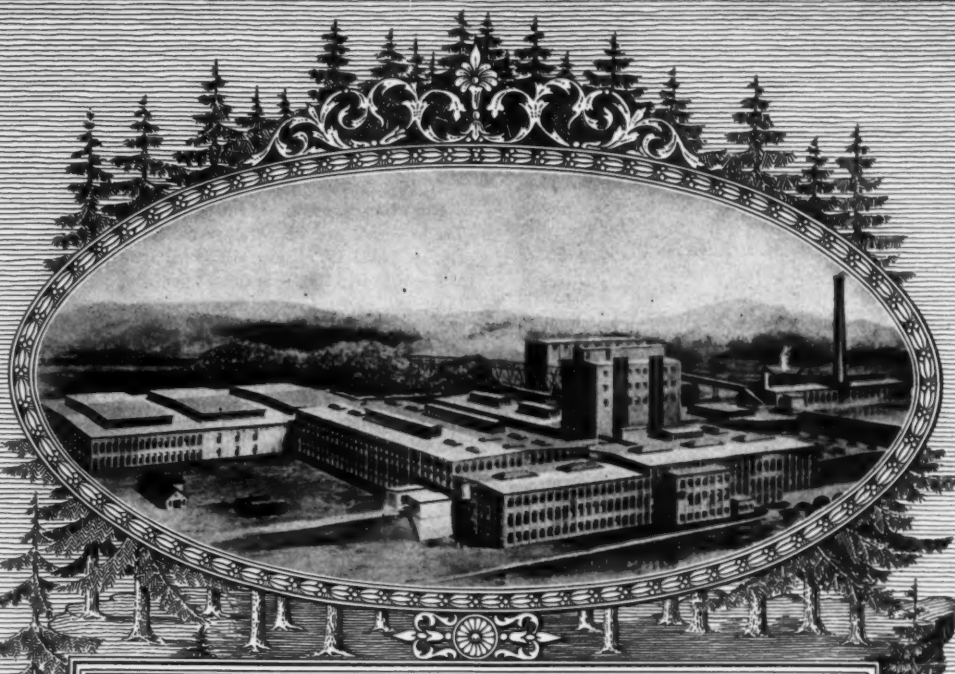

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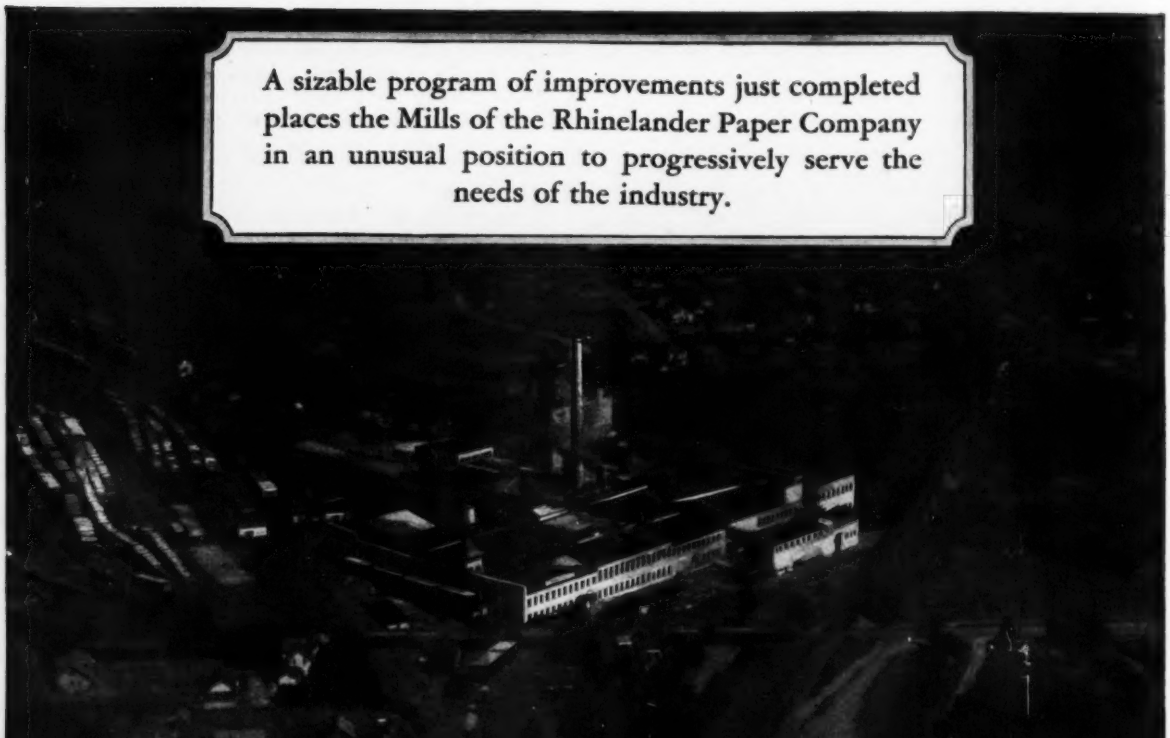
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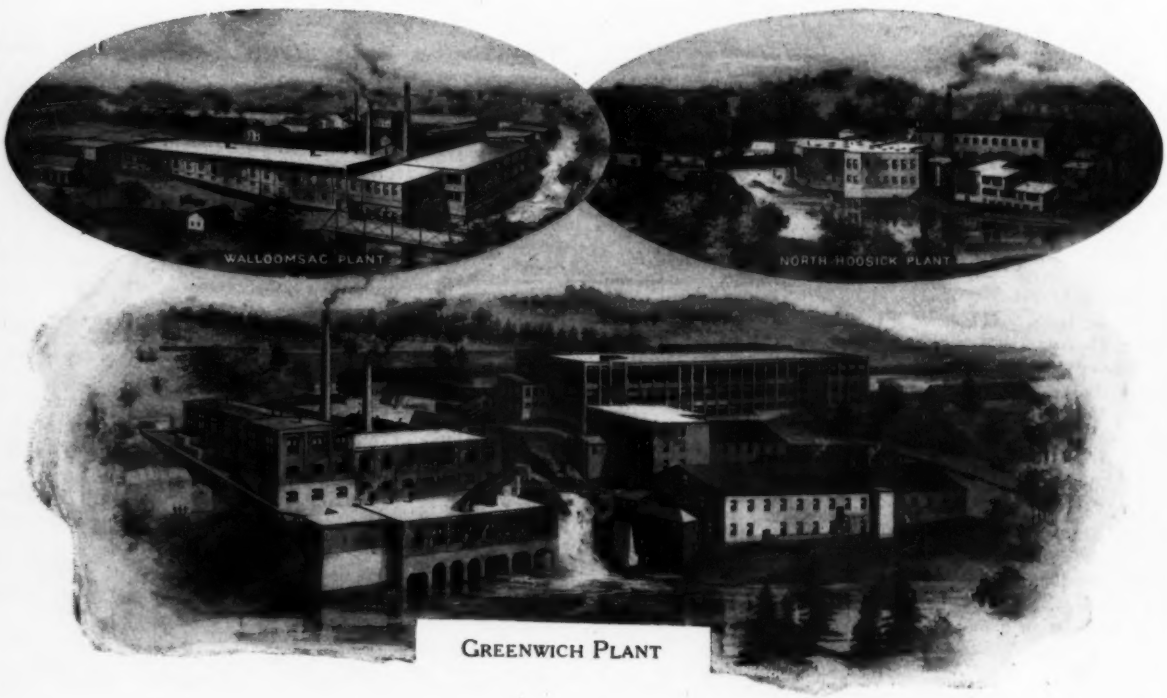

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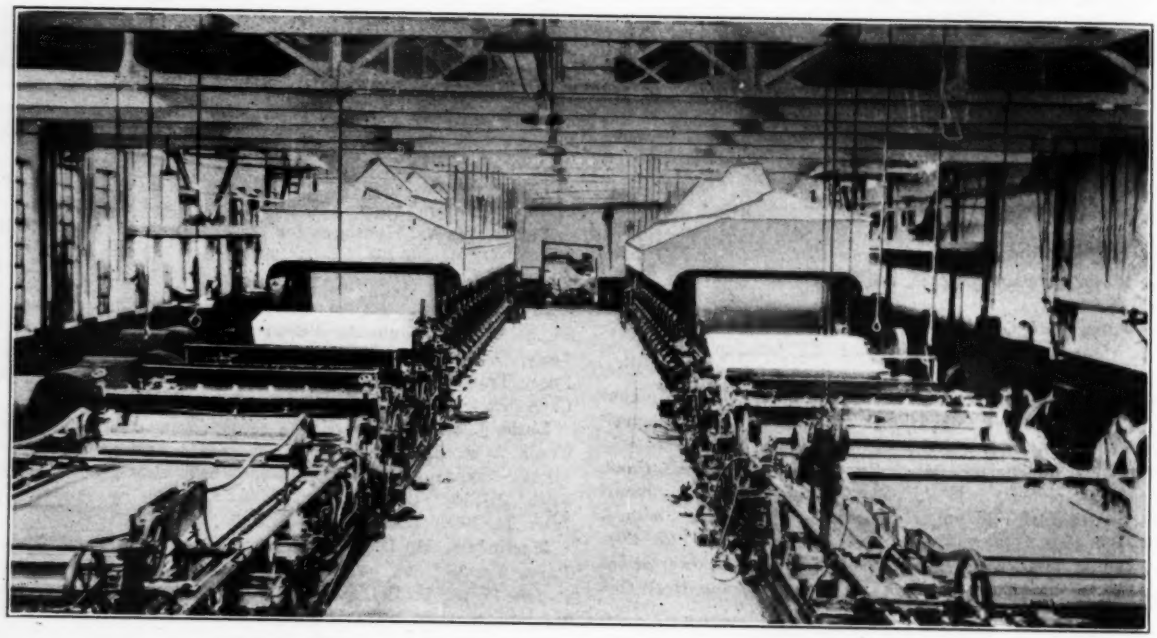

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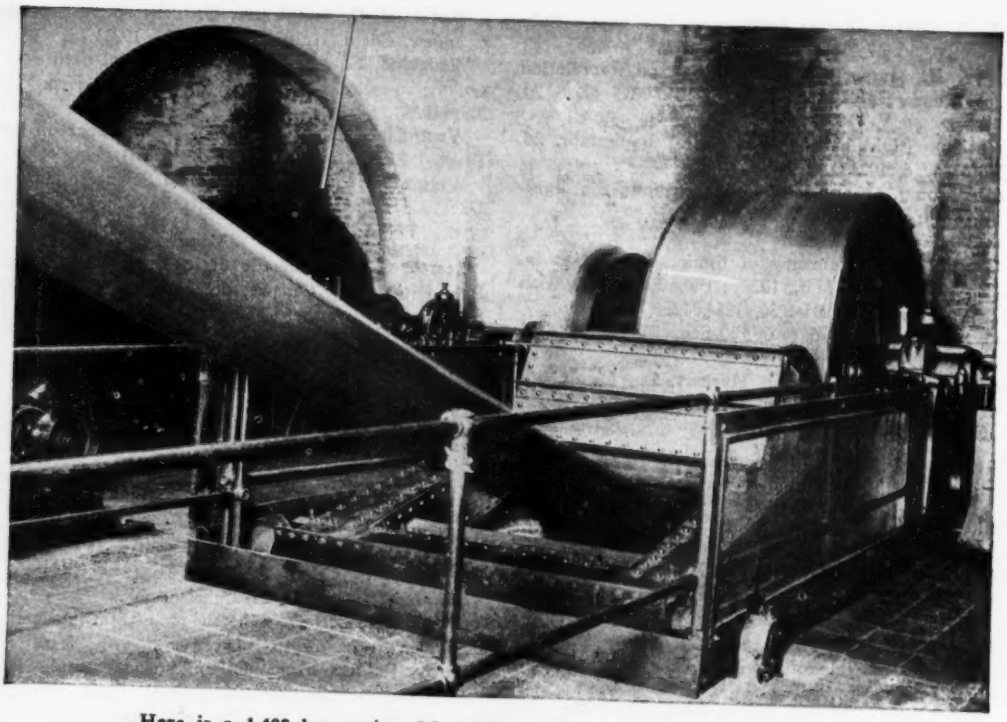

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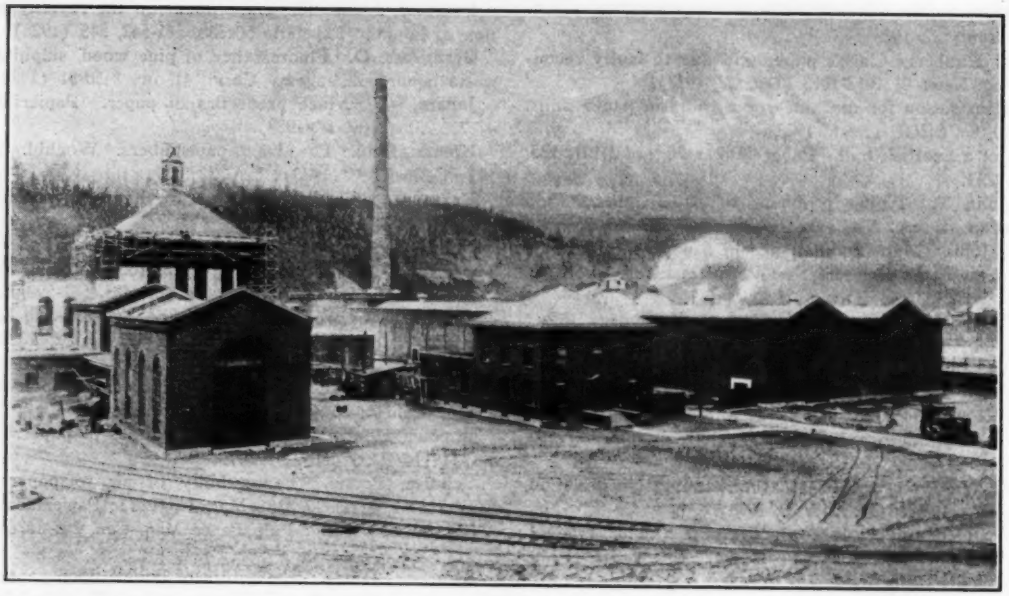

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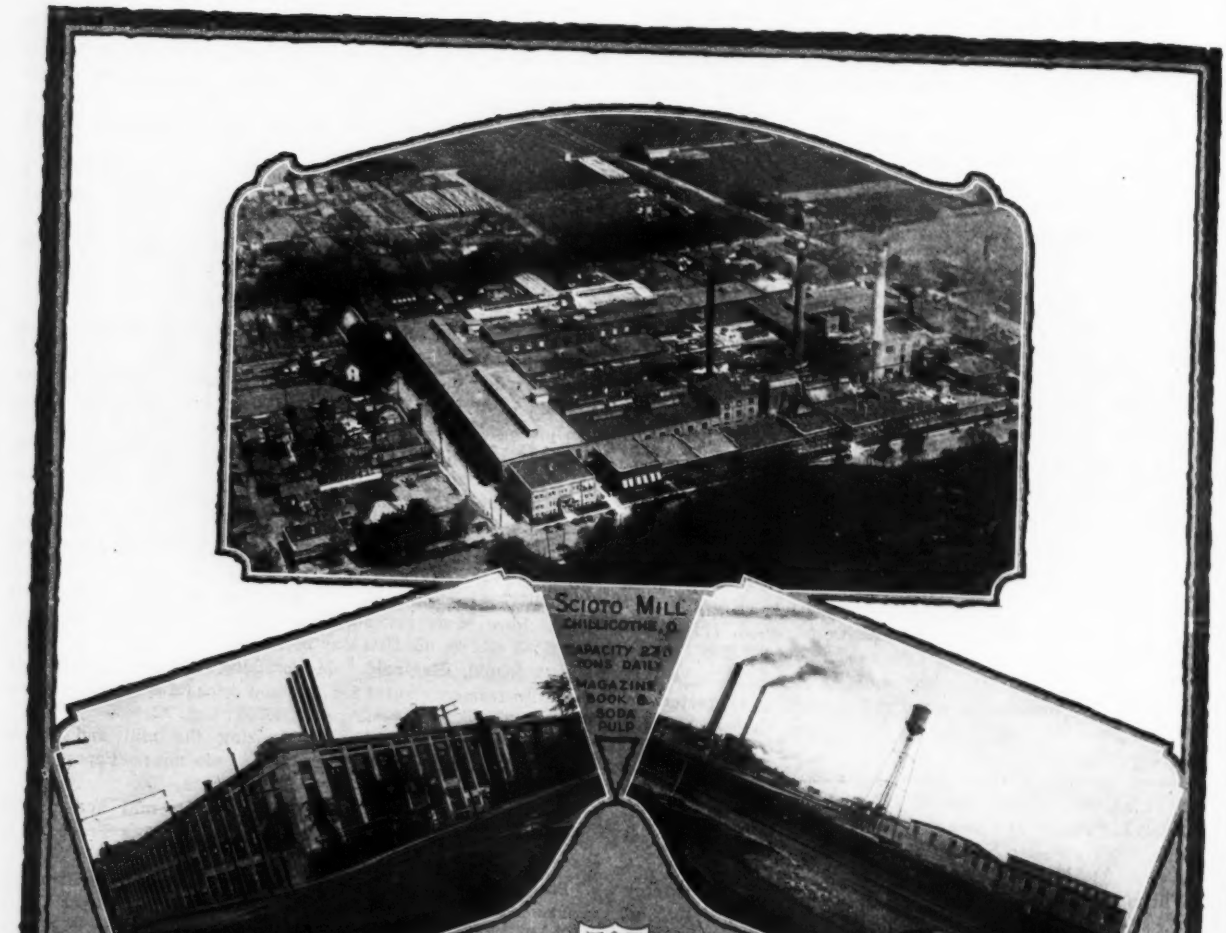

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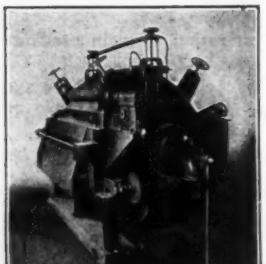

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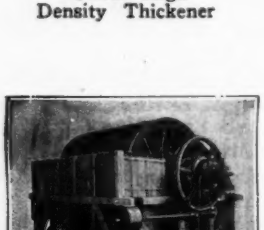

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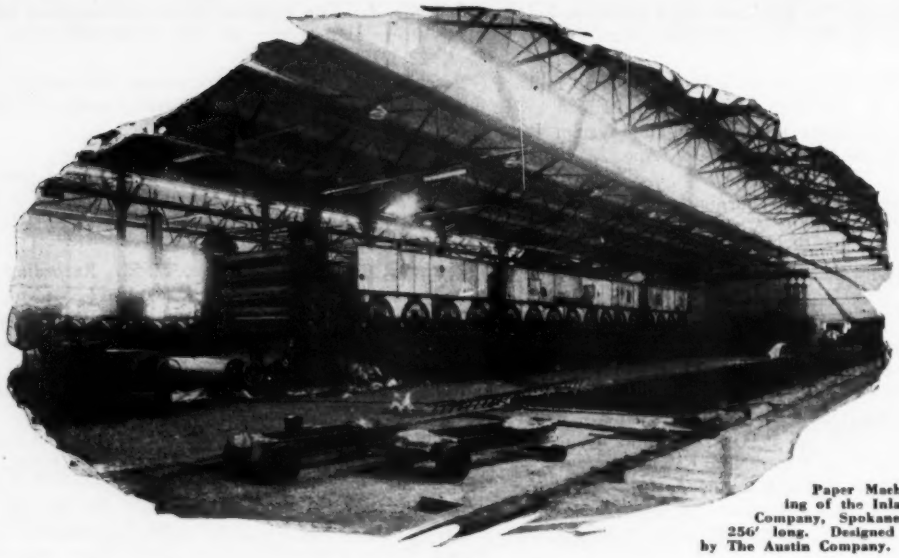

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See also Save alls.

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Proposed Methods for Analysis of Rosin Size *

By E. Frank Whittington [1]

The following procedure is that being used in this laboratory but is still in the experimental stage, not having been exhaustively proven or checked by other methods. The fact that checkable results are consistently obtained however seems to indicate the reliability and accuracy of the method.

The principal reason for the development of this method was the lack of a platinum dish for alkali determination and the inaccuracy in using porcelain due to fusion of the alkali with the porcelain.

The theory involved is that the amount of acid necessary to liberate the combined rosin is directly proportional to the amount of alkali combined with the rosin.

The number of wet size weighings has been reduced from 4 to 2.

Sampling

The sample should be taken from the tank car before unloading or from the storage tank when the car is about half out. Care should be taken to get the sample below the surface. This can be accomplished by tying a bottle on to a long stick and lowering it into the size until it is nearly submerged. A sudden downward thrust will carry the bottle well below the surface before any size will flow in. A cork with string attached may be used but is no advantage. In removing smaller samples from the bottle be sure to stir well each time. Keep well stoppered. In the case of drum shipments, any one drum of a shipment should be representative and the sample taken either by dipping or pouring from the heated drum.

Total Solids

Weigh approximately 2 gms. of thick size into a tared evaporating dish and dry in the electric oven for 30 minutes at 230 degrees F. Cool and weigh. Repeat with 10 minute heatings until weight is constant. Save.

Total Moisture

By difference.

Free Rosin

While waiting for the above sample to dry a second sample of approximately 2 gms. may be weighed in a tared beaker 150 cc., dissolved in alcohol and titrated with N/10 alcoholic KOH using phenolphthalein as indicator.

The alcoholic KOH is made by dissolving 5.61 gms. KOH in 1 liter of grain alcohol and standardizing against N/10 acid.

1 cc. N/10 KOH = .0346 gm. abietic acid or rosin.

Note:—In case grain alcohol is not available then special denatured alcohol formula No. 30 may be used.

The endpoint is difficult to see due to the color of the solution so great care must be taken. Looking through the solution from the side instead of from above is advantageous.

Total Rosin

To the residue from the total solids determination add a few drops of boiling water to moisten. Stir and add water slowly, heating over a flame or in the oven if desired. Care should be taken not to add too much water at first as this will cause a breaking up of the size into small particles which will float around and are difficult to get into solution. Make a paste first and then keep diluting. One hundred cc. of water should be sufficient. Wash into a separatory funnel and run in about 40 cc. of N/10 H_2SO_4.

Add a pinch of common salt to the solution and this will aid in the separation of the ether layer later.

Wash with about 15 cc. of ether in No. 1 separatory funnel and allow at least 5 minutes for the layers to separate. Draw off water layer into No. 2 separatory funnel and the ether layer into No. 3. Rinse No. 1 funnel with 15 cc. ether and run into No. 2. Wash No. 2 and allow to separate (5 min.). Draw water layer into No. 2 and ether layer into No. 3. Rinse No. 2 with 10 cc. ether and run into No. 1. Repeat this procedure using 10 cc. portions of ether until the ether layer is colorless, also the water layer. If the water layer shows a brownish or yellow color you have not used enough acid. Test with Methyl Orange using as outside indicator on spot plate. (Do not put M.O. into your solution.) Add more acid if necessary and extract to colorless layers.

When you have extracted all the rosin wash the ether solution twice with distilled water drawing the water layer into the funnel containing the other water solution. Save.

Draw the ether-rosin mixture into a weighed Soxlet flask and distill ether into Soxlet extractor. In the absence of a Soxlet any small flask which can be weighed on the fine balance will do and the ether reclaimed through a Leibig condenser or allowed to waste.

Distill off ether and reweigh flask. Difference in weight of flask is total rosin.

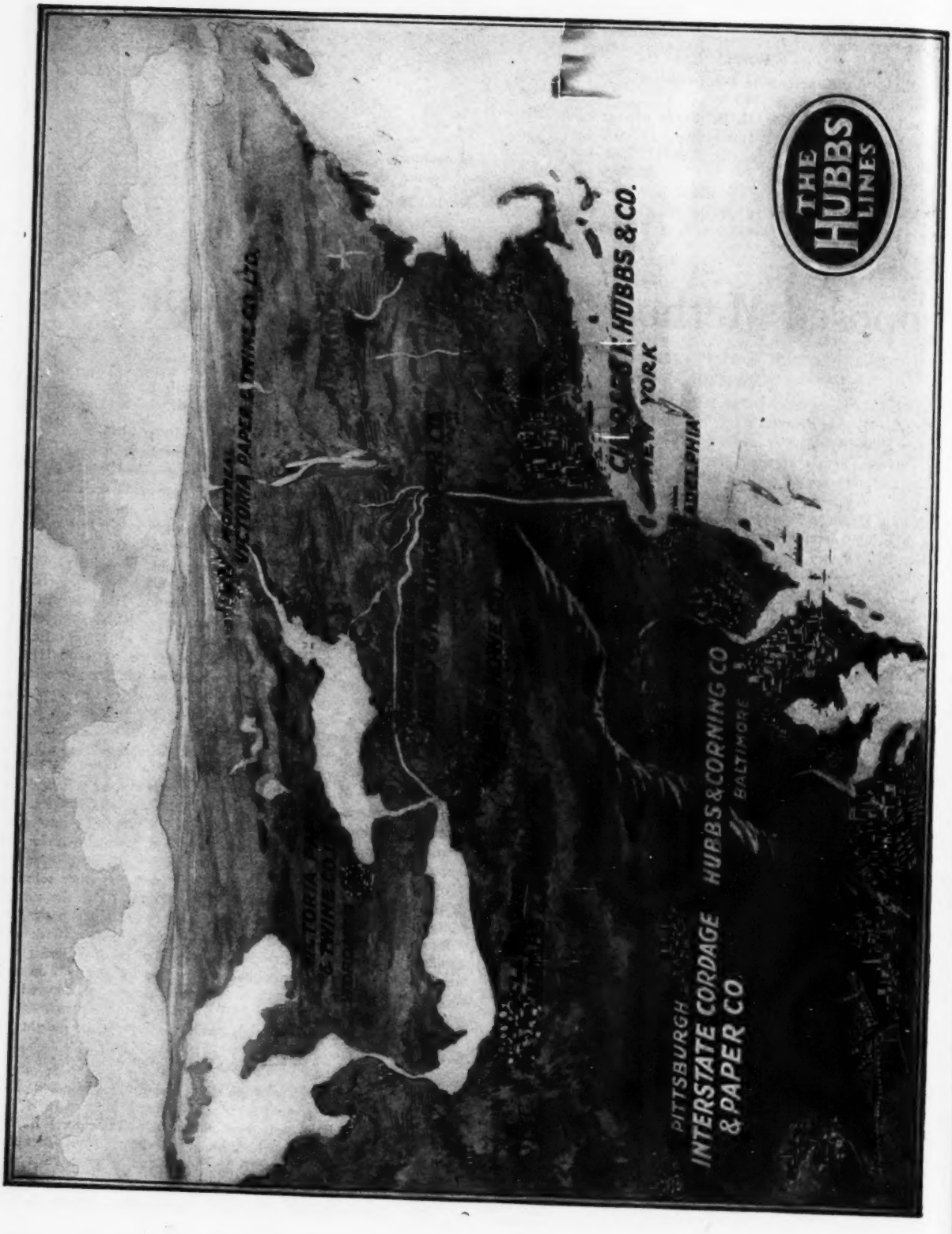
Total Alkali

Draw the wash waters from total rosin determination into a titrating flask or larger beaker and titrate your excess H_2SO_4 by using N/10 NaOH and phenolphthalein as indicator. Before titrating it is well to place the flask in the electric oven for about 10 to 15 minutes to drive off any dissolved ether as this will interfere with the results when titrating.

From the net amount of N/10 H_2SO_4 used determine total alkali,

1 cc. N/10 H_2SO_4 = .0031 gm. Na_2O
= .0053 gm. Na_2CO_3

* Presented at Annual Meeting of TAPPI, New York, Feb. 21, 1929.
[1] Member TAPPI; Chief Chemist, Sutherland Paper Co., Kalamazoo, Mich.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Quality of Purified Wood Fibers*

By Royal H. Rasch [1]

I. Purpose and Scope

The sulphite process of pulping wood is so recent a development in the history of paper-making that, until a few years ago, very little definite information was available as to the actual aging qualities of papers prepared from this type of cellulose fiber. It was not known how long a carefully prepared sulphite paper could resist deterioration. Observations of authentic samples of these papers, after years of natural aging, have revealed conclusively, the fact that the ordinary grades of sulphite pulps are not adaptable to the manufacture of various types of papers in which the combined qualities of great strength, durability and permanence are required. These observations, together with the well-known fact that some century-old books printed on rag papers are still in existence in a high state of preservation, strengthened the belief that for these special qualities, particularly permanence, a content of high grade rag fibers was essential and that wood fibers were by nature, and as a result of drastic methods used to pulp them, relatively weak and impermanent. Supporting this belief were the early views of cellulose chemists who held that cellulose from wood was chemically distinct from cotton cellulose. With improved methods of isolating wood cellulose in pure form, has grown the belief that it is identical to cotton cellulose in its chemical properties and subject to the same reactions.

Years of research have been devoted to the purification of wood fibers for various purposes until at the present time wood fibers for paper-making are being produced commercially by special processes which make them similar to paper-making rag fibers. Owing to these similarities, the purified wood fibers are superceding the higher-priced rag fibers in many papers, even in those intended for use as permanent records. No data, however, have been available to the industry on the relative merits of this new fiber and other types of paper-making fibers. In response to a general demand for information of this kind, an investigation for the purpose of obtaining such data was undertaken by the Bureau of Standards in cooperation with one of the manufacturers of purified wood fibers, the Brown Company, Berlin, New Hampshire. The purpose of this paper is to preesnt, in the form of a progress report, the information and data which have been obtained so far on relative qualities of purified wood fibers as compared to other typical paper-making fibers.

This paper will deal with a study of the more important chemical and physical properties of papers and paper-making fibers and the effect of accelerated aging tests on these properties. The investigation has thus far been limited to a study of representative commercial products.

II. Detailed Outline of Program

The program of work was separated into three parts: a study of paper-making fibers, a study of commercial papers and a study of papers prepared in the Bureau of Standards paper mill. The kinds of fibers included are only those used for fine writing papers.

1. A Study of Paper-Making Fibers

A preliminary study of purified wood fibers and other typical commercially-prepared paper-making fibers entering into the manufacture of papers was first planned in order to determine the characteristics, principally chemical, of the different fibers and if possible to what extent these characteristics limit the permanence and other physical properties of papers. It was planned to obtain these samples from manufacturers of highest grade products, so that they would be representative of the best materials commercially obtainable at the present time. The following types of paper-making fibers were selected for the work since they cover the range of fibers generally used for the manufacture of the better grades of papers.

Cotton rag half-stocks [2]:
- From new rags
- From used rags

Wood pulps:
- Purified wood pulps
- Sulphite pulps
- Soda pulps

Their wide variations in chemical purity and in the character and chemical nature of the impurities they contain offer a ready means of studying the relative effects of the different impurities on the various properties of the cellulose fibers with which they are associated, and consequently of the papers into which they are converted.

It was proposed to make the commonly-applied permanence determinations such as, alpha cellulose content, copper number, pentosan content, resin content and ash content; also, to determine the color characteristics of the fibers and their viscosity in cupra-ammonium solution. Since aging is known to have a marked effect on the chemical as well as physical properties of cellulose products, the more significant of the above tests were to be repeated on samples which had been subjected to accelerated aging tests.

2. A Study of Commercial Papers

Next in the program of work was included a study of purified wood-fiber papers and various other types of high-grade commercial papers prepared from fibers similar to those outlined above, under 1. Included in this comparison were, not only the applicable tests made on the paper-making fibers, but also all the commonly-applied strength tests, as well as an examination of the papers for

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* The preprinting of this paper is authorized by the Director of the Bureau of Standards, Department of Commerce, with the understanding that it is subject to revision by the bureau before its final publication.

Presented at Annual Meeting of TAPPI, New York, Feb. 19, 1929.

[1] Research Associate, Bureau of Standards, Washington, D. C., for the Brown Company, Berlin, N. H.

[2] A brief description of the various paper-making fibers and methods used in their preparation is given below. For a more comprehensive discussion, the reader is referred to the various text books on pulp and paper-making practice.

Most rags as they arrive at the mill require a chemical and mechanical cleaning. In the case of new white rags, the constituent fibers are harsh, due to the presence of naturally occurring resins and waxes, and, even though sufficiently clean, are not well suited for direct conversion into paper. Old rags contain various impurities, such as dirt, grease and dye, which must be removed. The rags which are first sorted, cut into small pieces and dusted, are boiled under pressure with lime or caustic soda or a mixture of the two. The amount of these chemicals used as well as the other conditions of the cooking operation vary from mill to mill and according to the kind of rags. After cooking, the rags are washed with a large volume of water in a beater and are simultaneously broken up and brushed out. The beater consists of an oval trough and a revolving beater roll on which there are a series of bronze or steel blades engaging similar blades in the bottom of the trough. A means is provided for withdrawing the wash water as fast as fresh water is added. At this point the rags are more or less discolored and require a bleaching treatment to bring them to the desired whiteness. For this purpose, one to five per cent of calcium hypochlorite is used, depending upon the kind of rags. The final washed stock is technically termed "half-stock" or "half-stuff."

In the sulphite process wood chips are digested under pressure with a solution of bisulphites of alkaline earth metals (chiefly calcium) containing free sulphurous acid. The undesirable lignin compounds as well as a large portion of the resinous materials and sugars are broken down, while the cellulose itself remains relatively unattacked. In subsequent washing and screening operations the soluble reaction products, dirt and coarse fragments are removed. The desired whiteness of fiber is obtained by bleaching with calcium hypochlorite, and finally washing. This material is referred to as "bleached sulphite pulp."

The soda process depends upon the fact that the various undesirable impurities associated with cellulose in wood are very soluble in hot caustic soda solutions. Chips of the wood are cooked in digesters under pressure with the alkali and the resultant fiber is washed and bleached in much the same manner as in the sulphite process. The final product is termed "bleached soda pulp."

For an idea of the methods employed in the manufacture of purified wood fibers, the reader is referred to a bibliography of patents on the subject: "Manufacture of High Alpha Cellulose," by Joseph Rossman, Paper Trade Journal, 86, No. 15:206 (April 12, 1928); also, "Production of Pulp with High Alpha Cellulose," Paper Trade Journal, 85, No. 8:75 (August 25, 1927). In general, fibers of this type are prepared by digesting wood pulps, manufactured by the usual pulping processes, in alkaline media to remove the remaining undesirable non-cellulosic materials, as well as any modified celluloses that were formed.

A Certificate of Quality

Every product of the International Paper Company is certified as to quality. International insures its reputation by jealously guarding its standards of quality and is constantly seeking to improve its products even though they are already leaders in their fields.

With its unparalleled sources of supply, International can and does use economically only the best materials for each grade. These high quality materials are combined by experienced paper makers and made into finished products by up-to-date, efficiently equipped mills. The economy effected through its enormous purchasing powers and equally impressive production enables International to offer its products at prices that are lower than are usually demanded for papers of equal quality.

Leading, among the forty grades of paper made by the International Paper Company are the following:

Book Bond Offset Envelope Tablet Writing Superoto Waxing Coating Hanging Carbonizing Ground-Wood Specialties Newsprint

All certified products of

INTERNATIONAL PAPER COMPANY

Main Sales Office: 100 East 42nd St., New York, N. Y.

Branch Sales Offices

Boston Chicago Atlanta Pittsburgh Philadelphia

fiber composition, acidity and for the kind and amount of sizing materials present. It was planned to make a thorough study of the probable degree of permanence of the different papers, as measured by the extent to which their various chemical and physical properties resist the effects of heat, light and moisture.

3. A Study of Papers Prepared in the Bureau of Standards Paper Mill

With the results of the investigation of commercial papers and paper-making fibers as a basis, the plan of work finally included a study of a series of papers prepared in the Bureau of Standards paper mill equipment,[3] in order to establish more conclusively the relative paper-making qualities of the different types of fibers. This work involves the preparation, from each type of material under consideration, the best possible quality of paper, in which have been eliminated as far as possible, most of the variables entering unavoidably into the manufacture of papers at different mills. As is well known, these variables (such as, treatment of fibers in the beater, amount and quality of sizing materials, acidity and method of drying paper) all influence to a very marked extent the final quality of the paper, and limit more or less any conclusions that can be made as to the inherent quality of the basic fibers.

III. Description of Methods Used

1. Preparation of Samples

(a) Preliminary treatment of wood pulps and rag half-stocks.—In order to insure a high degree of uniformity in the method of handling samples, they were all, immediately upon being received, thoroughly mixed, slushed with water and converted into 10 by 12-inch sheets using the laboratory hand sheet mold.[4] Sufficient stock, made into a uniform suspension with water, was taken to give sheets weighing about 40 grams bone-dry. The sheets were pressed between clean felts after which they were allowd to dry at room temperature, and then carefully stored for future use.

In measuring color characteristics of fibers, it was found more convenient to use thinner sheets, and for this purpose sheets weighing 10 grams were made up.

(b) Preparation of cellulose materials for chemical testing.—Papers, as well as wood pulps and rag half-stocks, were reduced to a fibrous form before being subjected to the various chemical tests. A discussion of the reasons for using material of this type, as well as a description of the apparatus employed, is given later on.

2. Test Methods

(a) *Chemical*—

(1) Alpha Cellulose Content.—By the so-called alpha cellulose content of a cellulosic material is meant the percentage of ash-free material resisting the action of sodium hydroxide of mercerizing strength. The method has been used to a great extent in the viscose industry as an aid to the determination of the suitability of pulps for the manufacture of rayon; and to a lesser extent in the paper industry as a means of judging the chemical purity of paper-making fibers. It has become recognized that there is a relationship between the paper-making qualities of a given material and its content of caustic-resistant cellulose, and as a result, more and more importance is being attached to this method. In this investigation considerable time has been devoted to this phase of the study, and a number of methods and modifications considered. The method as finally adopted is given below in detail.

Weigh out accurately 5 grams of the air-dry disintegrated sample into a 400 cc. beaker. Add 50 cc. of an 18 per cent sodium hydroxide solution (1.200 sp. gr.) at 20 degrees C. Let stand 1 or 2 minutes until pulp has absorbed caustic. Macerate well with a flattened glass rod and add another 50 cc. portion of caustic. Again macerate and allow to stand ½ hour from time caustic was first added, the temperature being held at 20 degrees C. Fill the beaker with distilled water at exactly 20 degrees C. and filter through a fine mercerized cotton cloth on a Buchner funnel. Return the filtrate through the pad, and wash carefully with 1 liter of water at 20 degrees C. Remove the filtrate and save for the beta-cellulose determination . Wash the pad with 100 cc. of 20 per cent acetic acid and finally with 1 liter of boiling distilled water. Place pad in drying oven, and when fairly dry remove cloth filter, carefully scraping off with a spatula any adhering fibers. Transfer to a weighing bottle. Dry at 105 degrees C. to a constant weight. The result is reported as per cent alpha-cellulose based on bone-dry fiber, the moisture and ash being determined on a separate sample.

(2) Copper Number.—The amount of copper reduced from a Fehling's solution by a given amount of cellulose material is termed the copper number of that material. This method finds wide use as a means of measuring the reducing power of the modified or degraded celluloses and other impurities present in the fiber and is generally considered a convenient means of predicting the probable extent to which a fiber will resist chemical or physical deterioration. The modified procedure as developed at the Bureau of Standards especially for determining the copper number of papers was used.[5]

(3) Pentosan Content.—Together with pentosans is included any other furfural-yielding substances that may be present, such as pectins in cotton. Oxycellulose is said to give slight yields of furfural on distillation with hydrochloric acid. The method used is similar to the usual ones involving the distillation of the sample with dilute hydrochloric acid, except that precipitation was accomplished by the use of thiobarbituric acid instead of phloroglucinol.[6]

(4) Resin Content.—The resin content as determined includes all the substances present which are extractable with acidulated alcohol, such as, rosin used in sizing papers, naturally-occuring resins, waxes, etc. The official procedure of the Technical Association of the Pulp and Paper Industry was followed.

(5) Ash Content.—The ash content is of importance since it indicates the amounts of mineral chemical residues left in the fibers; and in the papers, whether a mineral filler has been added. The official TAPPI procedure was followed.

(6) Acidity.—Acidity in paper is usually due to one or both of two causes. Either to alum (which is added to the beater in rosin sizing and to the glue, as a preservative for surface-sizing) or to the acidic nature of decomposition products of cellulose itself. This decomposition resulting in the development of acidity is thought to be due to auto-oxidation resulting from the presence of alum or other inorganic acid materials, or from the use of paper-making fibers containing oxycelluloses, lignin or other impurities which affect their stability. Therefore, in any study of permanence, acidity is a factor of extreme importance. The method described by Hall has been tentatively adopted.[7] Acidity number may be described as the number of cubic centimeters of .01 normal sodium hydroxide solution required to make the extract of ten grams of bone-dry disintegrated fiber neutral to phenolphthalein indicator.

(7) Glue.—The amount of glue used for surface-sized papers has a marked effect upon many of the strength qualities of the papers. The official TAPPI method was used.

(b) *Physical*—

(1) Commonly-applied tests.—All the commonly-applied,

[3] For photographs of this equipment see: Shaw, M. B., and Bicking, G. W., Comparison of American and Foreign Clays as Paper Fillers. Bureau of Standards Technologic Paper No. 262, pp. 340-341. Price, 15 cents (Government Printing Office).

[4] Shaw, M. B., and Bicking, G. W., Paper Trade Journal, 79, No. 21:51 (Nov. 20, 1924).

[5] Scribner, B. W., and Brode, W. R., A Modified Method for the Determination of the Copper Number of Paper. Bureau of Standards Technologic Paper No. 354. Sept. 24, 1927. Price, 5 cents (Government Printing Office).

[6] Directions given by Dox and Plaisance, Journal American Chemical Society, 38, 2156 (1916).

[7] Kohler, S., and Hall, G., Acidity in paper. Paper Industry, 7, No. 7: 1-5 (Oct., 1925).

New York & Pennsylvania Company

Pulp and Paper Makers

GENERAL OFFICES

200 FIFTH AVENUE

NEW YORK CITY

official TAPPI paper testing methods were used, as: basis weight, thickness, bursting strength, folding endurance, tearing strength and tensile strength.

(2) Color.—In classifying various papers and paper-making fibers according to their color characteristics, or more especially, in comparing the stability of samples of these materials toward accelerated aging tests ordinary methods of grading according to observations of the unaided eye are unsuited, since the variations are in many cases extremely slight. In this investigation comparisons of color characteristics were based on measurements made with the Pfund Colorimeter.[8]

(c) *Accelerated Aging Tests*—

(1) Exposure to Dry Air at 100 C.—The exposure of samples, to be investigated for permanence qualities, to elevated temperatures offers the most convenient of the available methods. This was one of the methods used at the Government Testing Institute at Stockholm in their investigation of permanence of papers, and was considered by the workers there to accurately simulate the effects of natural aging.[9] As conducted at the Bureau of Standards, a closed oven of the electric resistance type was employed. (See Fig. 1) A fan and air duct keep the air in constant, rapid circulation thus maintaining a uniform temperature throughout the oven. A thermostat and relays are provided for controlling the temperature. The variations in temperature in an oven of this type are within 1 degree C±. Suitable racks are provided for suspending samples.

(2) Exposure to Humidified Air at 95 C.—This test is used to study the combined effects of heat and moisture on the various characteristics of papers. The test is conducted in the same oven described under (1). Beakers of water are placed in the oven in order to humidify the atmosphere.

(3) Exposure to Actinic Rays from Arc Light.—A study in the chemistry division of the Bureau of Standards of apparatus designed for finding the effect of light on materials has revealed the fact that a carbon arc lamp is well adapted to simulate the effects of natural sunlight and gives reproducible results when the conditions under which the samples are maintained during exposure are carefully controlled. For this purpose a cabinet has been provided, in which the temperature and humidity may be kept at any desired point. (See Figs. 2 and 3). Top and sides (except exposure side) consist of triplicate window glass, while exposure

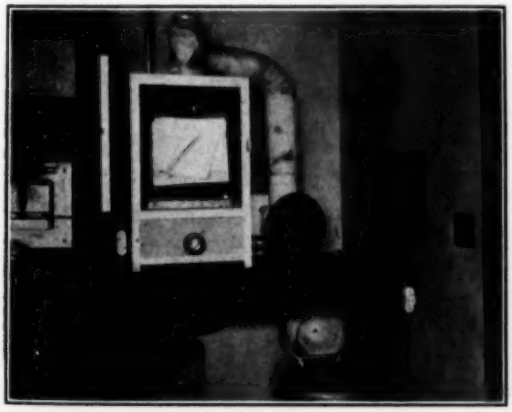


Fig. 1

side consists of two thicknesses of a special glass, which is thinner and said to be somewhat more transparent to the actinic rays from the arc than ordinary glass. A thermostat is provided for controlling the temperature and a small fan keeps the air circulated and uniform in temperature throughout the cabinet. The desired humidity is maintained by means of the proper salt solution.

(4) Exposure to Steam at Atmospheric Pressure.—The use of steam as an accelerated aging test is based upon the observation that papers or pulp samples when exposed to the action of live steam show a marked tendency to revert in color. This test is conducted in a galvanized iron chest well insulated with magnesia

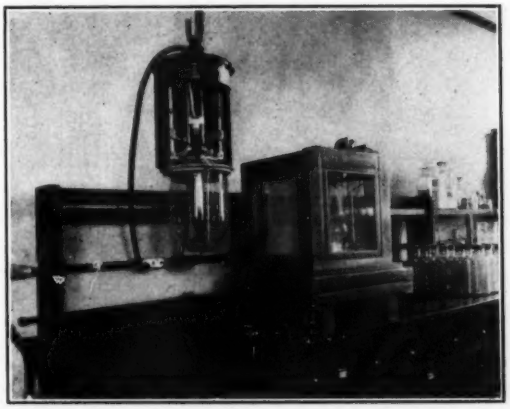


Fig. 2

and provided with a cover containing a number of holes to permit the escape of steam. Live steam is injected through an inlet in the bottom of the chest. The samples to be exposed are suspended on suitable racks provided in the cabinet.

IV. Description of Samples Studied

Following are tabulations of the samples studied, together with their code numbers and a brief description of each sample as given by the manufacturers who supplied them.

1. Paper-Making Fibers

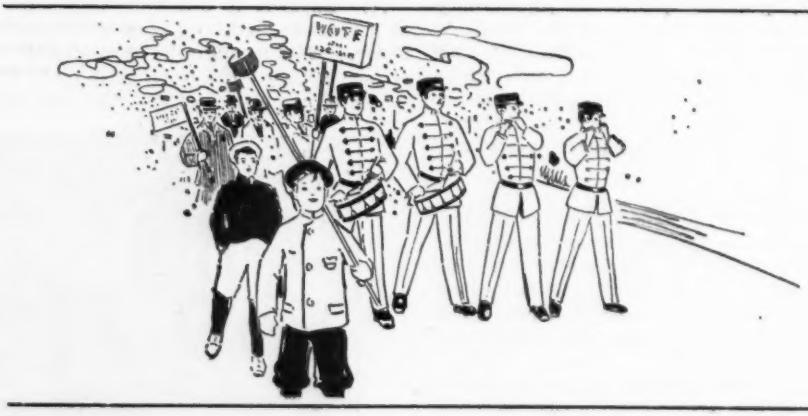
The following samples of paper-making fibers represent products of thirteen different manufacturers.

Fig. 3

No. 1. Bleached sulphite pulp. Bond paper grade.
No. 2. Purified wood pulp. Paper-making grade.
No. 3. Purified wood pulp. Paper-making grade.
No. 4. Bleached soda pulp. Book paper grade.
No. 5. Old colorful rag half-stock. "Twos and blues" grade.
No. 6. New white rag half-stock. "No. 1 Unbleached" grade.
No. 7. Bleached sulphite pulp. Bond paper grade.
No. 8. Old white rag half-stock. "No. 1 White" grade.

[8] Pfund, A. H., A New Colorimeter for White Pigments and Some Results Obtained by Its Use. American Society for Testing Materials, June, 1920; also Lofton, R. E., A Measure of the Color Characteristics of White Papers. Bureau of Standards Technologic Paper No. 244, August 28, 1923. Price, 5 cents (Government Printing Office).

[9] Hall, G., Permanence of Paper. Paper Trade Journal, 82, No. 14:185-191 (April 8, 1926).



The Big Parade Goes By!

Their banners and slogans fly in the breeze proclaiming their messages to those who stand by.

The pile of morning's mail on your desk, and even the little mail box outside your door at home, hold further messages and propaganda to be read in leisure moments.

You may not have heard the radio or seen the parade, but you do get the direct mail messages and read them.

Here's where OLD COLONY READY TO PRINT MAILING SETS come in,—Envelopes, Sheets and Cards, in matched sets, Ready to Ship, Ready to Print, and Ready to produce effective direct mail advertising for you.

Send for sample portfolio and prices, and list of stocking agents.

Old Colony Envelope Company

Westfield, Mass.

No. 9. New white rag half-stock. "New White shirt cuttings."
No. 10. Old white rag half-stock. "Extra No. 1 White" grade.
No. 11. New white rag half-stock. "Unbleached muslins."
No. 12. New white rag half-stock. "Mixture of 75 per cent new white shirt cuttings and 25 per cent bleached shoe cuttings."
No. 13. Old white rag half-stock. "Mixture of 50 per cent 'No. 1 White' and 50 per cent 'No. 2 White cottons.'"
No. 14. New white rag half-stock. "New white shirt cuttings."
No. 15. New colored rag half-stock.
No. 16. Old white rag half-stock. "Old white cuttings."
No. 17. Bleached sulphite pulp. Bond paper grade.
No. 18. Purified wood pulp. Special grade for esterification.
No. 19. Bleached sulphite pulp. Special grade for esterification.
No. 20. Bleached sulphite pulp. Special grade for esterification.
No. 21. Bleached soda pulp. Book Paper grade.
No. 22. Bleached soda pulp. Book paper grade.
No. 23. Bleached sulphite pulp. Bond paper grade.
No. 24. Bleached sulphite pulp. Bond paper grade.
No. 25. Bleached sulphite pulp. Bond paper grade.
No. 26. Purified wood pulp. Paper-making grade.
No. 27. Purified wood pulp. Paper-making grade.
No. 28. Purified wood pulp. Special grade for esterification.
No. 29. Purified wood pulp. Paper-making grade.
No. 30. Purified wood pulp. Paper-making grade.
No. 31. Purified wood pulp. Paper-making grade.
No. 32. Purified wood pulp. Paper-making grade.

2. Commercial Papers

The following papers represent products of twelve different manufacturers.

No. 101. All-rag bond paper. Prepared from new rags. Rosin [10] and glue-sized.[11]
No. 102. All-rag bond paper. Prepared from new rags. Rosin and glue-sized.
No. 103. Rag paper. Prepared from new rags. Contains a small amount of sulphite fiber. Rosin and glue-sized.
No. 104. Rag paper. Prepared from new rags. Contains a small amount of sulphite fiber. Rosin and glue-sized.
No. 105. Purified wood fiber paper. Rosin and glue-sized.
No. 106. Purified wood fiber paper. Rosin and glue-sized.
No. 107. Purified wood fiber paper. Rosin and glue-sized.

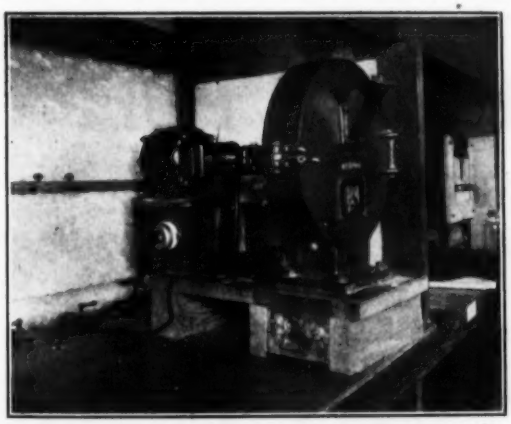


Fig. 4

[10] Ordinary printing and book papers and sulphite bond papers are sized with rosin alone. This operation takes place in the beater. A suspension of free rosin in a solution of sodium resinate is added to the stock in the beater and after it has been thoroughly incorporated with the fiber, aluminum sulphate is added to set the sizing material. The subsequent drying on the finishing end of the paper machine fuses the rosin particles and completes the efficiency of the sizing operation.

[11] High-grade bond and record papers are "tub-sized" or "surface-sized" with glue. Glue imparts to papers many desirable qualities impossible to obtain by the use of rosin-sizing alone; for example, an excellent writing surface, increased durability and resistance to wear, as well as certain intangible qualities of appearance, feel, etc. Papers of this type are practically always first rosin-sized in the usual manner and then surface-sized by passing the sheet through a solution of animal glue. In the best practice the glue-treated paper is loft-dried, that is, it is suspended in a festoon arrangement in a special chamber where it is dried under carefully-controlled conditions of temperature and humidity.

No. 108. Sulphite writing paper. Rosin-sized.
No. 109. Sulphite bond paper. Rosin-sized.
No. 110. Sulphite bond paper. Rosin-sized.
No. 111. Bond paper prepared from a mixture of rag fiber and sulphite pulp. Rosin-sized.
No. 112. Same paper as No. 111 but surface-sized with glue.
No. 113. All-rag bond paper. Prepared from new rags. Rosin and glue-sized.

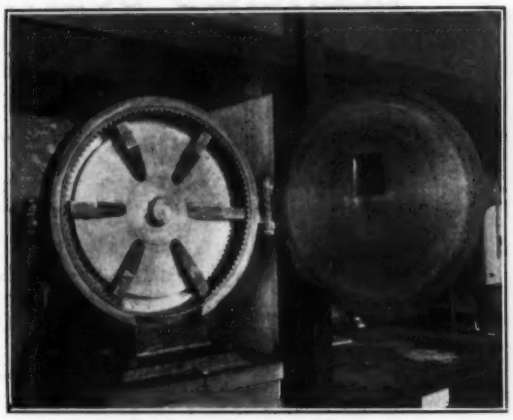


Fig. 5

No. 114. All-rag bond paper. Prepared from new rags. Rosin-sized.
No. 115. Sulphite bond paper. Rosin-sized.
No. 116. Sulphite bond paper. Rosin-sized.
No. 117. Sulphite bond paper. Rosin-sized.
No. 118. All-rag bond paper. Same as No. 114 but surface-sized with glue.
No. 119. All-rag bond paper. Prepared from new rags. Rosin-sized.
No. 120. All-rag bond paper. Same as No. 119 but surface-sized with glue.
No. 121. All-rag waterleaf [12] paper. Used for acetylation.
No. 122. Purified wood fiber paper. A waterleaf paper used for nitration.
No. 123. Book paper. The beater furnish was 50 per cent soda pulp, 25 per cent sulphite pulp and 25 per cent converted old papers. High clay content. Rosin-sized. High finish.
No. 124. Book paper. Beater furnish similar to No. 123 but has lower clay content. Bulkier and softer sheet than No. 123.
No. 126. All-rag bond paper. Prepared from 60 per cent new white shirt cuttings and 40 per cent unbleached muslins. Rosin and glue-sized.
No. 127 The same paper as No. 126 sampled before the glue-size tub.
No. 128. All-rag bond paper. Prepared from 100 per cent unbleached muslins. Rosin and glue-sized.
No. 129. The same paper as No. 128 sampled before the glue-size tub.
No. 130. All-rag paper. Prepared from 100 per cent "No. 1 White old rags." Rosin and glue-sized.
No. 131. The same paper as No. 130 sampled before the glue-size tub.
No. 132. Paper prepared from a mixture of rag fiber and sulphite pulp. Rosin and glue-sized.
No. 133. The same paper as No. 132 sampled before the glue-size tub.
No. 134. Sulphite bond paper. Rosin-sized.
No. 135. Sulphite writing paper. Rosin-sized.
No. 147. Book paper, magazine grade.

[12] "Waterleaf" is a mill term signifying unsized paper. Such paper is usually of a very absorbent nature and unsuited for writing or purposes where a degree of water resistance is required.

CHEMICAL AND MECHANICAL PULP

BLEACHED SULPHITE

Kellner-Partington Paper Pulp Co. Ltd.
Sarpsborg, Norway—Edsvalla, Sweden
Hallein and Villach, Austria

UNBLEACHED SULPHITE

Cellulosefabriks A.—G., Bratislava, Cecho-Slovakei
Bergvik och Ala Nya Aktiebolag, Söderhamm, Sweden
Svanö Aktiebolag, Svanö, Sweden
Aktieselskabet Greaker Cellulosefabrik, Greaker, Norway

KRAFT PULP

Nensjö Cellulosa A.—B., Sprängsviken, Sweden
Bergvik och Ala Nya Aktiebolag, Söderhamn, Sweden
Munksunds Aktiebolag, Munksund, Sweden

Selling Agents

J. ANDERSEN & CO.

21 EAST 40th STREET NEW YORK

WAYAGAMACK KRAFT PULP

CANADIAN KRAFT LTD.

THREE RIVERS, CANADA

Sulphite Pulp—Paper and Board
J. & J. Rogers Co.,
Ausable Forks, N. Y.

Bleached Sulphite — Bleached Soda Pulp
Howard Smith Paper Mills, Ltd.
Cornwall, Ont., Canada

Selling Agents

THE PULP & PAPER TRADING CO.

21 EAST 40th STREET, NEW YORK CITY

The beater furnish for this paper was, 87 per cent soda pulp and 13 per cent sulphite pulp. High clay content. Rosin-sized.

No. 148.[13] Coating paper.

The beater furnish[14] for this paper was, 24 per cent sulphite pulp, 62 per cent purified wood fiber and 14 per cent broke.[15] Low clay content. Rosin-sized.

No. 152. Book paper. Rosin-sized.

The beater furnish for this paper was, 70 per cent soda pulp and 30 per cent sulphite pulp. High clay content. Rosin-sized.

V. Results

1. Wood Pulps and Rag Half-Stocks

(a) *Chemical Characteristics and Reaction toward Accelerated Aging Tests*—

(1) Alpha Cellulose Content.—Most procedures for the determination of alpha cellulose specify that the material being tested, especially if it is a wood pulp, shall be in the form of squares of a given size and thickness. Ordinarily this procedure is quite satisfactory, but for the purpose of the present investigation it has been considered advisable to make this and other chemical tests, such as copper number and acidity, with material disintegrated in a special apparatus provided for that purpose.[16] (See Figs. 4 and 5). It is very difficult to macerate papers, particularly sized and highly finished papers, with mercerizing caustic; and impossible to do so in a reproducible manner (even with waterleaf papers) unless the sizing material and formation of the sheet is broken up in such a way as to make the fibers available to the action of the caustic. The least objectionable method of accomplishing this result appears to be by the use of the disintegrator already referred to. In order to establish uniform methods of procedure in this work and to have a common basis for the comparison of alpha cellulose values obtained on papers and on paper-making fibers, it was considered desirable to convert the latter into the same disintegrated form before applying the alpha cellulose and other chemical tests. In obtaining comparative alpha cellulose values for different types of fibers, there is another factor that requires consideration. Different materials in sheet form do not macerate with equal ease in mercerizing caustic, although this would appear to be essential where a direct comparison of this type is being made. For example, it was found that squares of purified wood fibers absorbed the caustic readily, forming a smooth, even suspension of well separated fibers, thus exposing a maximum of surface to the action of the caustic; on the other hand, the rag half-stocks, more or less in the form of small bits of cloth, threads and knots, could not be thoroughly pulped at all. Another difficulty encountered was that the soda pulps became extremely resistant to the penetration of caustic after the heat treatment. It was found, however, that all the above difficulties could be obviated by using disintegrated fiber. Table 1 summarizes the effects of grinding on different types of materials. Each value is a composite of results obtained on all available samples of a given type of material. It is clear that the alpha cellulose values obtained on disintegrated fibers are from 1 to 2 per cent lower than those obtained on materials in sheet form, and that this decrease is somewhat greater for rag half-stocks than for wood pulps.

TABLE 1
EFFECT OF DISINTEGRATION ON ALPHA CELLULOSE VALUE OF TYPICAL PAPER-MAKING FIBERS

Type of fiber	Alpha Cellulose Content: ¼ inch squares of sheeted fibers, Per cent	Alpha Cellulose Content: Disintegrated fibers, Per cent	Difference in alpha cellulose value caused by disintegration
New rag	99.0	97.0	2.0
Used rag	95.5	93.4	2.1
Purified wood fiber	94.0	92.6	1.4
Sulphite pulp	85.8	84.5	1.3
Soda pulp	75.1	73.9	1.2

TABLE 2
CHEMICAL TESTS ON VARIOUS PAPER-MAKING FIBERS

Sample Number	Alpha cellulose content: Control sample, per cent	Alpha cellulose content: Sample heated 72 hours at 100 degrees C., per cent	Alpha cellulose content: Amount of initial alpha cellulose lost, per cent	Copper number: Control sample	Copper number: Sample heated 72 hours at 100 degrees C.	Copper number: Increase in copper number, per cent	Resin: Control sample, per cent	Pentosans: Control sample, per cent	Ash: Control sample, per cent
Tests on Rag Half-Stocks									
11	98.2	97.1	0.1	0.79	1.00	27	0.29	....	0.21
9	97.7	97.7	0.0	0.77	0.89	16	0.33	0.23	0.16
12	97.5	97.0	0.5	0.77	0.89	16	0.28	....	0.10
6	96.7	96.3	0.4	0.82	0.97	18	0.40	0.13	0.14
16	95.8	95.3	0.5	1.26	1.35	7	0.28	....	0.10
14	95.1	94.3	0.8	1.24	1.41	14	0.30	....	0.16
8	94.2	93.2	1.1	1.05	1.14	9	0.94	0.12	0.28
15	93.5	92.3	1.3	1.82	1.94	7	0.37	....	0.41
13	92.1	91.1	1.2	...	...	..	0.72	....	0.24
10	91.4	90.3	1.2	0.93	*1.33	43	0.67	....	0.24
5	83.8	81.6	2.6	2.55	2.80	10	0.79	0.33	0.50
Tests on Purified Wood Pulps									
3	93.8	93.6	0.2	...	...	..	0.29	2.12	0.15
27	93.2	93.3	0.1 (gain)	1.33	1.44	8	0.20	....	0.10
18	93.2	92.7	0.5	...	...	..	0.32	....	0.12
28	93.1	92.8	0.3	...	...	..	0.31	....	0.14
2	92.4	92.5	0.1 (gain)	...	...	..	0.27	3.32	0.19
31	92.4	92.2	0.2	0.89	1.00	12	0.32	....	0.09
26	92.3	92.5	0.2 (gain)	1.23	1.34	9	0.38	....	0.13
32	91.9	91.9	0.0	0.90	0.98	9	...	....	0.10
29	91.5	91.2	0.3	0.89	1.02	14	0.25	....	0.19
30	91.5	91.3	0.2	0.93	1.06	14	0.27	....	0.19
Tests on Sulphite Pulps									
20	86.5	85.1	1.6	...	...	..	0.77	....	0.22
19	86.1	85.3	0.9	...	...	..	0.81	....	0.16
17	85.3	...	..	3.22	3.18	1	0.49	....	0.19
23	84.8	83.2	1.9	3.20	3.25	2	0.63	....	0.15
7	84.1	83.0	1.3	3.32	3.55	7	0.10	3.86	0.16
25	83.8	82.7	1.3	...	...	..	0.72	....	0.14
24	83.2	81.9	1.6	2.98	3.10	4	0.50	....	0.17
1	82.7	81.3	1.7	3.29	3.45	5	0.52	3.32	0.23
Tests on Soda Pulps									
21	78.9	78.5	0.5	2.54	2.58	2	0.72	....	0.58
4	74.6	73.5	1.5	3.71	4.01	8	0.89	12.12	0.32
22	68.1	66.0	3.1	2.57	2.96	15	0.45	....	0.52

In Table 2 the alpha cellulose results obtained for individual samples of paper-making fibers are given, also results obtained with samples heated 72 hours at 100 C. The effect of this artificial aging is expressed as the percentage of original alpha cellulose lost.

Although several different types of rag half-stocks, widely different in their various properties, are included in this study, it is convenient to consider them together in one group. New, carefully bleached cotton cloth has an alpha cellulose content of very nearly 100 per cent; that is, it is practically pure cellulose. Therefore, the values obtained for the half-stocks represent the extent to which the cellulose has been modified or degraded either in preliminary treatments or in the actual preparation of the half-stock. New, white, unused rags require a much less drastic treatment in their preparation than colored or used rags and therefore, may be expected to have a much higher percentage of unchanged cellulose. The results reveal this to be the case. The half-stocks prepared from new white shirt cuttings, unbleached muslins and the like, have alpha cellulose values ranging from 95.1 per cent to 98.2 per cent; a half-stock prepared from new colored rags (No. 15) had a value of 93.5 per cent; half-stocks from good grades of old white rags contained from 91.4 per cent to 95.8 per cent of alpha cellulose. The grade known as "Twos and blues" (No. 5), one sample of which was available for study, is prepared from old colored rags which require very drastic cooking and bleaching treatments in order to convert them into paper-making half-stock. Its alpha cellulose content is evidently a fairly accurate indication of how drastic this treatment has been.

It is evident from a glance at the column of results indicating the loss in alpha cellulose suffered by the various half-stocks due to the heat treatment that the stability of these samples is de-

[13] Coating papers are those used as a base for enameled or coated papers.
[14] This paper was found to contain 25 per cent deciduous wood fiber.
[15] "Broke" is the trimmings and waste from the paper machine.
[16] Hall, G., Permanence of Paper. Paper Trade Journal, 82, No. 14:185-191 (April 8, 1926); also, Scribner, B. W., and Brode, W. R., A Modified Method for the Determination of the Copper Number of Paper. Bureau of Standards Technologic Paper No. 354. Sept. 24, 1927. Price, 5 cents (Government Printing Office).

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pendant mainly upon the original alpha cellulose content. These results with half-stocks lend themselves to interpretation more readily than those obtained with wood fibers because the caustic-soluble impurities present are of a less complex nature, consisting almost entirely of modified cellulose. These degradation products of the pure cellulose probably aid catalytically, in proportion to the amounts present and their chemical nature, to cause further oxidation of the remaining celluloses. The heat probably accelerates as oxidizing action which under normal aging conditions would take years. As the half-stocks studied have a wide range of chemical purities, similarly do they present examples of great variations in stability toward artificial aging. New rag half-stocks, that is, those of highest grade, are in general very stable to the effects of the heat treatment. It appears, however, that this is not necessarily the case for sample No. 14, though prepared from new white rags, has an alpha cellulose content of but 95.1 per cent (low for this type of material) and is correspondingly less stable than others of this type. On the other hand, sample

TABLE 3
EFFECT OF OXYCELLULOSE IN OVERBLEACHED RAG HALF-STOCK ON PERMANENCE OF ALPHA CELLULOSE

Bleach consumed Per cent	Alpha cellulose content: Before heating Per cent	Alpha cellulose content: After heating 72 hour at 100 degrees C. Per cent	Decrease in initial alpha cellulose content Per cent
0	98.2	98.1	0.1
1	95.5	94.4	1.2
3	87.3	85.4	2.2

No. 16, gives evidences of having been carefully processed, since, although prepared from a used grade of rags, it has an alpha cellulose content of 95.8 per cent and loses but 0.5 per cent of this on being heated. To further illustrate the effects of oxycelluloses on the permanence qualities of cellulose fibers, samples of high-grade rag half-stock were purposely overbleached with different amounts of calcium hypochlorite. The bleached samples were thoroughly washed to remove chemical residues, made into sheets on the laboratory hand mold, and then allowed to dry at room temperature. Alpha cellulose determinations were made on the original and heat treated samples. These values, which are given in Table 3, indicate very clearly the damaging influence of oxycellulose on the stability of cellulose fibers. They further serve to justify the importance of the alpha cellulose determination itself.

It might be predicted that the wood fibers would react differently toward the accelerated aging tests than the rag fibers since they contain impurities not present in the latter in any appreciable amounts. It could be reasonably assumed, for example, that the pentosans, which are present in wood fibers and almost entirely absent from rag fibers, would have a different effect on the stability of cellulose than the oxycelluloses. Also, wood pulps contain some *gamma* cellulose (the caustic-soluble portion of a cellulose, which, in contra-distinction to *beta* cellulose, is not precipitated by acid) which was found to be almost entirely absent in any of the various types of rag stocks. Lignins which also occur in wood are probably not present in sufficient amounts, however, in any of the fibers here studied to influence the results obtained with them. In addition to the impurities distinct in nature from those present in rags, wood fibers also contain modified celluloses formed during the cooking and bleaching operations. It is not known how the modified celluloses in different types of wood fibers resemble, in their chemical characteristics, one another or those found in rag half-stocks, but it appears that regardless of source they are exceedingly detrimental to the permanence of the fiber.

To determine the precise effect of the different impurities found in wood pulps on such qualities as permanence and assign definite weights to them, is in an investigation of this nature, obviously impossible except in an indirect way. It is possible, however, to study the combined effect of these impurities on the stability of the cellulose fibers with which they are associated. The purified wood fibers are all very stable in alpha cellulose content to a 72-hours heating at 100 C, equalling in this respect the highest grade rag half-stock, despite the fact that they are on the average about 4 per cent lower in initial alpha cellulose content; they are distinctly superior to used white rag half-stocks although the alpha cellulose contents of the two materials is about the same. It will be further observed that sample No. 5 (a half-stock prepared from used colored rags) although it has an alpha cellulose content within the range of those of the ordinary sulphite wood pulps studied, is much less stable than they are. Again, soda pulps are seen to be exceedingly resistant to the artificial aging test considering the large amount of caustic-soluble material they contain. Referring to Figure 6 in which the relationship between original alpha cellulose content and percentage loss resulting from 72-hour heat treatment at 100 C is expressed graphically, it appears that the position of the curves for different types of fibers is determined by the character of the caustic-soluble constituents of these fibers. Apparently, a soda pulp having an alpha cellulose content of about 82 per cent would equal in stability a purified wood fiber of 94 per cent or a rag fiber of nine-eight per cent. This could be explained by assuming that the caustic-soluble impurities in wood pulps are, weight for

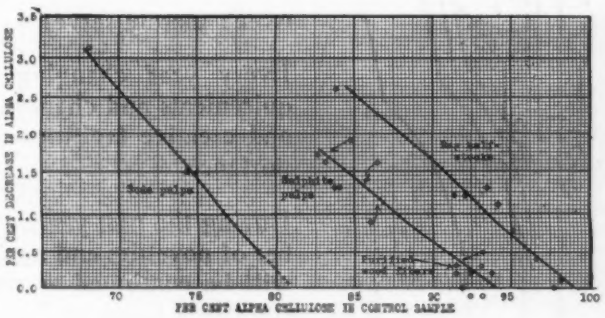

FIG. 6

Effect of artificial aging on alpha cellulose content.

weight, more passive in their deteriorating effects upon cellulose than those found in rag half-stocks.

(2) Copper Number.—The copper number values obtained for the various paper-making fibers are given in Table 2 together with the values for heat-treated samples. The copper numbers of the new white rag half-stocks range from 0.77 to 1.24 and appear to be slightly lower, on the average, than the values obtained on purified wood fibers which range from 0.89 to 1.33. Other grades of rag half-stock range in values from 0.93 to 2.55.

The ordinary types of wood fibers have considerably higher copper numbers than either the purified wood fibers or the better grades of half-stock. In general, the lower the alpha cellulose content of a material the higher will be its copper number. There are marked exceptions to this, however, the most striking being the soda pulps, which have a much lower alpha cellulose content than sulphite pulps and yet have, in most cases, lower copper numbers.

The increase in copper number after heating appears to offer no clue as to the probable relative permanence of the different types of fibers. In some cases the change apparently caused by the heating is within the range of experimental error, and therefore no great significance can be attached to the results.

(3) Pentosans[37]—Only a limited number of pentosan values are given in Table 2; however, these values are probably representative of those which would be obtained on other materials of a given type of paper-making fiber. The rag half-stocks here studied, have extremely low, almost negligible amounts of furfural-yielding substances present, whereas all the wood fibers contain appreciable quantities. The purified wood fibers contain from 2 per

[37] Determinations made by K. S. Markley, Associate Chemist, Bureau of Standards.

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cent to more than 3 per cent; the ordinary sulphite wood pulp from over 3 per cent to nearly 4 per cent; while the one sample of soda pulp tested had pentosans present to the amount of 12 per cent. The fact that soda pulps can contain such large amounts of pentosans and still have relatively good permanence qualities as compared to ordinary grades of sulphite pulps or poorer grades of half-stock, suggests that this substance does not contribute to the deterioration of cellulose to anywhere near the extent that the modified celluloses do. The pentosan content of the purified wood fibers may also account for the fact that these fibers, approximately 4 per cent lower in alpha cellulose content than high grade rag half-stocks, are as stable toward the accelerated aging test. That is, a great part of the difference in the alpha cellulose contents of the two materials represents this content of relatively inert pentosans.

It was previously noted that soda pulps had lower copper numbers than the higher alpha cellulose containing sulphite pulps. This is undoubtedly due to the fact that the pentosans, which are known to have no aldehyde groupings and consequently no reducing power toward Fehling's solution, are present in the former to a much greater extent.

(4) Other Tests.—The resin contents (alcohol-extractable materials) of the various fibers are given in Table 2. This impurity is present to a slight and about the same extent in new white rag half-stock and in the purified wood fibers. In ordinary wood pulps and in the used grades of rag half-stocks it is usually present in much greater amounts.

The ash contents of the various samples are also given in Table 2. With the exception of the soda pulps and a few of the poorest half-stocks these values are low and of little significance.

(b) *Physical Characteristics and Reaction toward Accelerated Aging Tests*—

(1) Color Characteristics.—High whiteness and brilliance are usually desired qualities in fine papers; as is, also the ability of the papers to preserve these qualities over long-time periods. The whiteness of a fiber is many times a direct indication of its chemical purity. The impurities generally indicated by poor color are the various natural coloring matters, resins, gums, lignin, etc. Cellulose fibers may, however, contain large quantities of oxycelluloses and yet have a high brilliant color.

In order to obtain information on the color characteristics of the various paper-making fibers and likewise on the relative permanence of these qualities, sheets of the different samples were tested on the Pfund Colorimeter and the color characteristics compared to those obtained on similar sheets heated for 72 hours at 100 C. Colors were determined in terms of relative brightnesses for three different wave lengths of light (red, green and blue). The values obtained are given in Table 4.

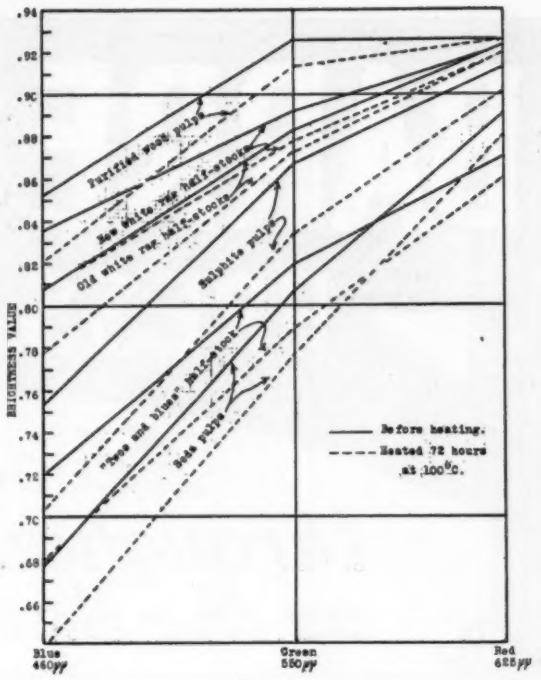

FIG. 7

Effect of artificial aging on color characteristics of typical paper making fibers.

The higher and the more uniform are the reflection coefficients for a given material, the closer does it approach a true white color. Pfund[18] states: ". . . *if it reflects non selectively it is to be called 'white.' According to this nomenclature, true grays are whites of different brightness.*" It will be seen that all the

TABLE 4.—COLOR STABILITY OF VARIOUS PAPER-MAKING FIBERS

Sample Number	Brightness value of control sample: Blue	Green	Red	Total brightness	Brightness value of sample heated at 100 degrees C. for 72 hours: Blue	Green	Red	Total brightness	Decrease in brightness value due to heating: Blue	Green	Red	Total decrease	
RAG HALF-STOCKS													
11	0.84	0.89	0.92	0.88	0.82	0.88	0.92	0.87	0.02	0.01	0.00	0.010	
9	0.84	0.89	0.92	0.88	0.82	0.88	0.92	0.87	0.02	0.01	0.00	0.010	
12	0.84	0.90	0.93	0.89	0.82	0.88	0.93	0.88	0.02	0.02	0.00	0.013	New white rags
6	0.83	0.88	0.92	0.88	0.80	0.87	0.91	0.86	0.03	0.01	0.01	0.017	
14	0.83	0.90	0.92	0.88	0.78	0.88	0.92	0.86	0.05	0.02	0.00	0.023	
16	0.84	0.90	0.93	0.89	0.80	0.80	0.88	0.93	0.04	0.02	0.00	0.020	
8	0.80	0.87	0.91	0.86	0.78	0.87	0.91	0.85	0.02	0.00	0.00	0.007	Old white rags
13	0.80	0.88	0.92	0.87	0.76	0.86	0.92	0.85	0.04	0.02	0.00	0.020	
10	0.79	0.88	0.93	0.87	0.77	0.87	0.92	0.85	0.02	0.01	0.01	0.013	
15	0.72	0.82	0.86	0.80	0.70	0.81	0.85	0.79	0.02	0.01	0.01	0.013	New colored rags
5	0.72	0.82	0.87	0.80	0.68	0.79	0.86	0.78	0.04	0.03	0.01	0.027	"Two's and blues"
PURIFIED WOOD PULPS													
27	0.87	0.93	0.93	0.91	0.84	0.93	0.93	0.90	0.03	0.00	0.00	0.010	
18	0.80	0.90	0.92	0.87	0.76	0.88	0.93	0.86	0.04	0.02	0.00	0.020	
28	0.86	0.93	0.93	0.91	0.84	0.93	0.93	0.90	0.02	0.00	0.00	0.007	
31	0.87	0.93	0.93	0.91	0.83	0.91	0.93	0.89	0.04	0.02	0.00	0.020	
26	0.86	0.93	0.93	0.91	0.84	0.93	0.93	0.90	0.02	0.00	0.00	0.007	
29	0.85	0.93	0.92	0.90	0.82	0.90	0.93	0.88	0.03	0.03	0.00	0.020	
30	0.86	0.93	0.92	0.90	0.82	0.91	0.93	0.89	0.04	0.02	0.00	0.020	
SULPHITE PULPS													
20	0.78	0.90	0.93	0.87	0.71	0.86	0.92	0.83	0.07	0.04	0.01	0.040	
19	0.77	0.89	0.92	0.86	0.74	0.86	0.92	0.84	0.03	0.03	0.00	0.020	
17	0.77	0.87	0.93	0.86	0.73	0.85	0.91	0.83	0.04	0.02	0.02	0.027	
23	0.72	0.85	0.90	0.82	0.68	0.81	0.88	0.79	0.04	0.04	0.02	0.033	
7	0.73	0.85	0.91	0.83	0.65	0.79	0.88	0.77	0.08	0.06	0.03	0.057	
25	0.77	0.86	0.90	0.84	0.71	0.84	0.90	0.82	0.06	0.02	0.00	0.027	
24	0.74	0.85	0.90	0.83	0.70	0.83	0.90	0.81	0.04	0.02	0.00	0.020	
SODA PULPS													
21	0.66	0.81	0.89	0.79	0.62	0.77	0.88	0.76	0.04	0.04	0.01	0.030	
4	0.70	0.81	0.89	0.80	0.65	0.78	0.88	0.77	0.05	0.03	0.01	0.030	
22	0.67	0.80	0.89	0.79	0.64	0.78	0.88	0.77	0.03	0.02	0.01	0.020	

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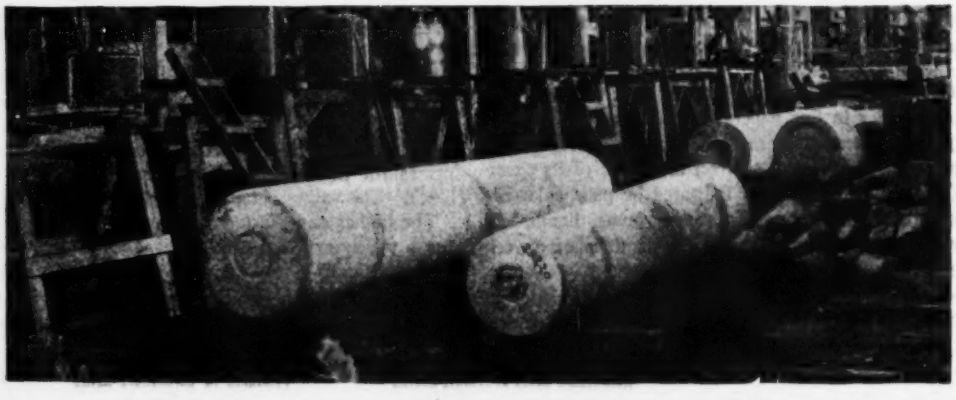

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TABLE 5.—TEST DATA ON VARIOUS ARTIFICIALLY-AGED PAPERS

Sample number	Fiber composition: Rag, per cent	Fiber composition: Coniferous wood, per cent	Fiber composition: Deciduous wood, per cent	Kind of sizing used	Chemical tests: Glue, per cent	Chemical tests: Resin, per cent	Chemical tests: Ash, per cent	Aging test: Temperature, degrees C.	Aging test: Duration, hours	Weight 500 sheets 25x40 inches, pounds	Thickness, inch	Bursting strength, points [1]	Ratio bursting strength to weight, per cent	Folding endurance: Machine direction, double folds	Folding endurance: Cross direction, double folds	Folding endurance: Average, double folds	Folding endurance in per cent of initial: Machine direction, per cent	Folding endurance in per cent of initial: Cross direction, per cent	Folding endurance in per cent of initial: Average, per cent	Tearing strength: Machine direction, grams	Tearing strength: Cross direction, grams	Tearing strength: Average, grams	Tensile strength: Machine direction, kilos	Tensile strength: Cross direction, kilos	Tensile strength: Average, kilos
TESTS ON ALL-RAG PAPERS																									
101-O	100	0	0	Rosin and glue-sizing	8.89	2.8	1.51	Control		75.6	.0048	91	120	3525	2490	3008	...	...	...	129.2	102.8	116.0	14.4	9.6	12.0
101-H24								100	24			88	116	2400	1825	2113	68.1	73.3	70.7	125.2	101.6	113.4	13.6	8.9	11.3
101-H72								100	72			82	108	2150	1375	1763	61.0	55.2	58.1	98.8	91.6	95.2	14.9	8.1	11.5
102-O	100	0	0	Rosin and glue-sizing	...	..	...	Control		101.3	.0061	119	117	3370	3950	3630	...	...	...	134.1	169.2	151.7	18.4	12.3	15.4
102-H24								100	24			114	112.5	2040	1990	2015	60.5	50.4	55.5	175.2	152.8	164.0	18.0	11.4	14.7
102-H72								100	72			101	100	1635	2335	1985	48.5	59.1	53.8	156.4	139.6	148.0	16.5	12.1	14.3
113-O	100	0	0	Rosin and glue-sizing	2.46	1.5	0.51	Control		66.1	.0040	66.2	100	3900	5595	4748	...	...	...	116.8	134.8	125.8	11.0	8.6	9.8
113-H24								100	24			68.7	104	3570	3258	3414	91.5	58.2	74.9	104.5	108.8	106.7	10.8	7.9	9.4
113-H48								100	48			65.6	99	2619	3200	2909	67.2	57.2	62.2	107.2	114.4	110.8	10.5	7.9	9.2
113-H72								100	72			62.9	95	2250	3427	2839	57.7	61.3	59.5	109.2	114.8	112.0	10.4	8.4	9.4
114-O	100	0	0	Rosin	0	1.4	0.10	Control		65.4	.0053	29.5	45	1665	439	1052	...	...	...	150.0	157.6	153.8	7.1	4.4	5.8
114-H24								100	24			32.2	49	1759	425	1092	106.0	96.8	101.4	152.0	147.2	149.6	7.2	4.4	5.8
114-H48								100	48			33.4	51	1304	398	851	78.5	90.7	84.6	133.6	150.8	142.2	6.9	4.7	5.8
114-H72								100	72			32.9	50	1333	341	837	80.3	77.7	79.0	132.4	126.4	129.4	7.1	4.8	5.9
118-O	100	0	0	Rosin and glue-sizing	4.65	1.6	0.60	Control		65.3	.0042	73.1	112	4656	6193	5425	...	...	...	133.6	153.2	143.4	11.2	8.2	9.7
118-H24								100	24			70.4	108	3214	4479	3847	68.9	72.4	70.7	119.2	126.0	122.6	10.9	8.0	9.5
118-H48								100	48			73.5	112	3440	3987	3714	73.8	64.6	69.2	113.6	136.0	124.8	11.0	8.1	9.6
118-H72								100	72			66.6	101	2550	3398	2974	54.7	55.0	54.9	102.8	117.6	110.2	11.0	7.9	9.5
119-O	100	0	0	Rosin	0	2.4	0.54	Control		67.1	.0054	42.5	63	2557	1668	2113	...	...	...	143.2	149.6	146.4	9.1	5.1	7.1
119-H24								100	24			42.6	64	2099	1049	1574	82.3	63.0	72.7	125.6	127.6	126.6	9.4	5.2	7.3
119-H48								100	48			42.6	64	915	799	857	35.8	48.0	41.9	99.2	105.6	102.4	...	..	..
119-H72								100	72			41.2	61	534	370	452	20.9	22.2	21.6	89.6	95.6	92.6	8.7	5.5	7.1
120-O	100	0	0	Rosin and glue-sizing	2.17	1.4	0.73	Control		66.4	.0053	69.0	104	3639	2814	3227	...	...	...	152.0	132.8	142.4	11.3	7.4	9.4
120-H24								100	24			66.0	99	3580	2628	3104	98.4	93.5	96.0	135.6	127.6	131.6	11.1	7.2	9.2
120-H48								100	48			67.1	102	2578	2524	2552	70.8	89.8	80.3	121.2	120.4	120.8	...	..	..
120-H72								100	72			65.5	99	2593	2601	2597	71.1	92.5	81.8	117.6	115.6	116.6	10.4	7.1	8.8
127-O	100	0	0	Rosin	0	2.2	0.75	Control		59.6	.0039	51.6	87	3337	1246	2292	...	...	...	112.0	108.4	110.2	9.4	5.5	7.5
127-H24								100	24			52.2	88	2502	1059	1781	75.0	85.0	80.0	104.4	99.6	102.0	...	..	..
127-H48								100	48			49.2	83	2174	1049	1611	65.0	84.3	74.7	92.8	95.6	94.2	...	..	..
127-H72								100	72			49.2	83	1902	1027	1526	56.8	82.5	69.7	91.6	84.8	88.2	9.4	5.7	7.6
126-O	100	0	0	Rosin and glue-sizing	4.64	2.3	0.80	Control		61.9	.0040	64.5	104	2985	1929	2457	...	...	...	97.6	90.8	94.7	11.5	6.9	9.2
126-H24								100	24			65.1	105	2804	1854	2129	80.4	96.2	88.3	91.2	86.8	89.0	...	..	..
126-H48								100	48			66.4	107	2652	1746	2199	88.7	90.5	89.6	86.4	84.8	85.6	...	..	..
126-H72								100	72			63.4	103	2206	1541	1873	73.8	79.8	76.8	85.6	84.8	85.2	11.5	6.6	9.1
129-O	100	0	0	Rosin	0	2.4	0.71	Control		60.3	.0038	48.1	80	3117	2606	2862	...	...	...	135.2	140.0	137.6	6.8	5.7	7.3
129-H24								100	24			51.5	85	2700	1661	2184	86.8	63.7	75.3	130.0	146.4	138.2	...	..	..
129-H48								100	48			49.6	82	2413	1342	1820	77.5	51.5	64.5	116.4	109.2	122.8	...	..	..
129-H72								100	72			51.8	86	1984	1334	1659	63.8	51.2	57.5	100.8	100.0	100.4	9.3	6.0	7.7
128-O	100	0	0	Rosin and glue-sizing	3.45	2.5	0.77	Control		65.2	.0040	69.2	106	3499	2628	3063	...	...	...	124.8	117.6	121.2	11.3	6.2	8.8
128-H24								100	24			67.2	103	3361	2198	2880	96.0	83.7	89.9	118.8	107.6	113.7	...	..	..
128-H48								100	48			64.7	99	3344	1893	2618	95.5	72.1	83.8	128.4	108.8	118.6	...	..	..
128-H72								100	72			63.5	97	2292	1904	2098	65.5	72.5	69.0	113.2	100.8	107.0	11.3	6.8	9.1
131-O	100	0	0	Rosin	0	1.7	0.82	Control		85.6	.0055	26.2	31	9.1	9.4	9.3	...	...	...	62.4	58.0	60.2	6.3	4.0	4.7
131-H24								100	24		25.8	25.8	30	6.3	7.2	6.8	69	77	73	65.2	61.2	63.2	...	..	..
131-H48								100	48			25.1	29	5.1	7.5	6.3	56	80	68	62.4	61.6	62.0	...	..	..
131-H72								100	72			25.2	29	5.5	6.7	6.1	60	65	63	58.8	64.8	61.8	5.6	4.3	5.0
130-O	100	0	0	Rosin and glue-sizing	3.44	1.5	0.72	Control		83.6	.0049	39.2	47	22	20	21	...	...	...	70.8	61.6	66.1	7.0	5.1	6.1
130-H24								100	24			39.5	47	20	16	18	91	80	86	67.6	65.2	66.4	...	..	..
130-H48								100	48			37.6	45	10	20	15	45	100	73	70.0	68.4	69.2	...	..	..
130-H72								100	72			37.6	45	8	14	11	36	70	53	70.0	66.4	68.2	7.2	5.3	6.4
121-O	100	0	0	Waterleaf	0	.09	0.10	Control		39.5	.0059	11.6	29	19.1	7.8	13.5	...	...	...	135.6	118.8	127.2	2.5	1.4	2.0
121-H72								100	72			11.9	30	24.2	7.1	15.9	127	91	109	140.8	110.4	126.6	2.4	1.4	1.9
TESTS ON PART-RAG PAPERS																									
103-O	95	5	0	Rosin and glue-sizing	6.72	1.8	1.22	Control		64.4	.0049	68	106	2500	2010	2255	...	...	...	98.0	126.0	112.0	11.2	7.5	9.4
103-H24								100	24			69	106	1860	1265	1563	74.5	63.0	68.8	97.6	98.0	97.8	11.0	7.3	9.2
103-H72								100	72			66	102	1875	1190	1533	75.0	59.2	67.1	91.2	90.0	90.6	11.5	6.9	9.2
104-O	90	10	0	Rosin and glue-sizing	7.73	1.9	1.15	Control		53.4	.0042	55	103	1880	1130	1505	...	...	...	70.4	92.8	81.6	9.1	5.7	7.4
104-H24								100	24			53	99	1345	570	958	71.6	50.2	60.9	68.8	78.0	73.4	8.5	5.2	7.9
104-H72								100	72			54	101	1120	695	908	59.5	61.5	60.5	71.2	85.6	78.4	8.9	6.0	7.5
111-O	60	40	0	Rosin	0	2.7	0.48	Control		68.1	.0049	33.3	49	102	71	87	...	...	...	86.3	80.6	83.4	7.6	4.5	6.1
111-H24								100	24			31.5	46	41	46	44	40.2	64.8	52.5	78.3	79.1	78.7	7.8	4.3	6.1
111-H48								100	48			30.7	45	41	39	40	40.2	54.9	47.6	70.5	70.0	70.3	7.5	4.2	5.9
111-H72								100	72			30.2	44	16	23	20	15.7	32.4	24.1	62.8	59.4	61.1	7.3	4.4	5.9
112-O	60	40	0	Rosin and glue-sizing	1.05	2.5	0.52	Control		63.6	.0047	37.0	58	206	107	157	...	...	...	74.3	68.9	71.6	8.4	4.4	6.4
112-H24								100	24			34.8	55	59	39	49	28.7	36.5	32.6	64.3	62.3	63.3	8.4	4.5	6.3
112-H48								100	48			35.3	56	51	39	45	24.7	36.5	30.6	65.8	58.0	61.9	6.0	4.4	6.2
112-H72								100	72			31.0	49	18	24	21	8.7	22.4	15.6	56.3	49.4	52.8	7.8	4.1	6.0
133-O	65	35	0	Rosin	0	1.6	0.39	Control		64.3	.0048	41.7	65	337	191	264	...	...	...	75.6	68.0	71.6	8.6	4.9	6.8
133-H72								100	72			35.6	55	42	32	37	12.5	16.7	14.6	58.0	52.0	56.0	7.6	4.7	6.2
132-O	65	35	0	Rosin and glue-sizing	1.12	1.5	0.43	Control		64.4	.0046	47.4	74	339	172	256	...	...	...	69.2	67.2	68.2	9.0	5.4	7.2
132-H72								100	72			40.4	63	38	40	39	11.2	23.2	17.2	56.0	54.8	55.4	8.4	5.0	6.7

[1] Approximately pounds per square inch.

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TABLE 5.—TEST DATA ON VARIOUS ARTIFICIALLY-AGED PAPERS—Continued

Sample number	Fiber composition: Rag, per cent	Fiber composition: Coniferous wood, per cent	Fiber composition: Deciduous wood, per cent	Chemical tests: Kind of sizing used	Chemical tests: Glue, per cent	Chemical tests: Resin, per cent	Chemical tests: Ash, per cent	Aging test: Temperature, degrees C.	Aging test: Duration, hours	Weight 500 sheets 25x40 inches, pounds	Thickness, inch	Bursting strength, points[1]	Ratio bursting strength to weight, per cent	Folding endurance: Machine direction, double folds	Folding endurance: Cross direction, double folds	Folding endurance: Average, double folds	Folding endurance in per cent of initial: Machine direction, per cent	Folding endurance in per cent of initial: Cross direction, per cent	Folding endurance in per cent of initial: Average, per cent	Tearing strength: Machine direction, grams	Tearing strength: Cross direction, grams	Tearing strength: Average, grams	Tensile strength: Machine direction, kilos	Tensile strength: Cross direction, kilos	Tensile strength: Average, kilos
TESTS ON PURIFIED WOOD FIBER PAPERS																									
105-O	0	100	0	Rosin and glue-sizing	2.74	1.4	0.34	Control		56.2	.0039	44	78	1420	800	1110	...	...	...	78.4	86.4	82.4	8.2	5.1	6.7
105-H24								100	24			45	79	1070	575	823	75.4	74.1	74.8	76.8	78.8	77.8	8.0	5.1	6.6
105-H72								100	72			43	77	655	495	575	46.9	61.9	54.4	65.2	70.4	67.8	8.1	5.1	6.6
106-O	0	100	0	Rosin and glue-sizing	2.36	1.5	0.51	Control		57.3	.0038	50	87	2465	1560	2013	...	...	...	78.8	76.0	77.4	10.3	5.2	7.8
106-H24								100	24			49	85	1585	1265	1425	64.3	81.0	72.7	80.8	71.2	76.0	9.7	4.7	7.2
106-H72								100	72			46	80	1635	1170	1403	66.3	74.9	70.6	78.4	66.4	72.4	10.2	5.2	7.7
107-O	0	100	0	Rosin and glue-sizing	2.19	1.2	0.39	Control		69.3	.0046	58.7	85	1855	1180	1518	...	...	...	112.8	98.8	105.6	11.4	5.3	8.4
107-H24								100	24			57.3	83	1455	830	1143	78.4	70.3	74.4	100.8	88.4	94.6	11.5	5.6	8.6
107-H48								100	48			57.1	83	1450	880	1165	78.2	74.5	76.4	95.6	86.0	90.8	11.9	5.5	8.7
107-H72								100	72			57.3	83	985	705	845	53.1	59.7	56.4	92.0	78.6	85.4	11.5	5.5	8.5
122-O	0	100	0	Waterleaf	0	0.1	0.15	Control		36.6	.0037	15.8	43	83	6.7	44.8	...	...	...	65.8	50.2	58.0	4.1	1.3	2.7
122-H72								100	72			15.8	43	85	7.0	46.0	103	105	104	60.4	47.6	54.0	4.3	1.4	2.8
TESTS ON SULPHITE PAPERS																									
108-O	0	100	0	Rosin	—	2.2	7.12	Control		64.6	.0039	24.9	39	15	17	16	...	...	...	50.4	48.8	49.6	6.7	3.0	4.9
108-H24								100	24			22.5	35	4	7	6	27	41	34	42.7	37.1	39.9	7.4	3.2	5.3
104-H48								100	48			21.5	33	2	3	3	13	18	16	37.3	33.4	35.4	7.3	3.4	5.4
108-H72								100	72			20.1	31	1	3	2	7	12	10	37.7	35.1	36.4	7.3	3.3	5.3
109-O	0	100	0	Rosin	—	2.4	1.06	Control		64.3	.0050	27.0	42	49	22	36	...	...	...	67.2	61.2	64.2	7.6	3.0	5.3
109-H24								100	24			22.8	35	13	11	12	27	50	39	55.9	46.2	51.1	7.5	3.0	5.3
109-H48								100	48			22.4	35	3	4	4	6	18	12	51.7	43.7	47.7	7.3	3.1	5.2
109-H72								100	72			21.0	31	2	4	3	4	14	9	45.1	40.0	42.6	7.1	3.2	5.2
110-O	0	100	0	Rosin	—	2.8	0.60	Control		53.3	.0037	33.6	63	529	249	389	...	...	...	59.4	50.0	54.7	8.6	4.6	6.6
110-H24								100	24			29.3	55	17	30	24	3	12	8	40.3	34.3	37.3	8.0	4.4	6.2
110-H48								100	48			26.2	49	7	12	10	1	5	3	38.7	31.5	35.1	7.4	4.3	5.9
110-H72								100	72			23.3	44	5	2	4	1	1	1	30.0	27.1	28.6	7.0	4.2	5.6
115-O	0	100	0	Rosin	—	1.3	2.61	Control		43.3	.0032	24.7	57	135	130	133	...	...	...	40.8	42.4	41.6	6.5	3.5	5.0
115-H24								100	24			21.3	49	25	40	33	18	31	25	34.3	33.7	34.0	5.6	3.1	4.4
115-H48								100	48			19.3	45	16	28	22	10	21	16	30.6	29.4	30.0	5.5	3.0	4.3
115-H72								100	72			20.2	47	12	28	20	9	21	15	29.1	28.8	29.0	5.8	3.1	4.5
116-O	0	100	0	Rosin	—	1.9	0.51	Control		65.8	.0043	36.9	56	501	364	433	...	...	...	76.8	73.2	75.0	9.5	5.1	7.3
116-H24								100	24			32.8	50	32	67	50	6	18	12	58.9	52.6	55.3	9.0	4.9	7.0
116-H48								100	48			30.0	46	4	17	11	1	5	3	48.6	44.0	46.3	9.0	4.7	6.8
116-H72								100	72			29.2	44	3	17	10	1	5	3	45.4	42.0	43.7	9.2	4.9	7.1
117-O	0	100	0	Rosin	0	1.4	2.92	Control		55.1	.0038	30.6	56	150	157	154	...	...	...	49.1	55.5	52.3	7.8	4.2	6.0
117-H24								100	24			28.0	51	30	62	46	20	40	30	41.4	47.1	44.3	7.6	4.1	5.9
117-H48								100	48			26.9	49	12	32	22	8	20	14	37.1	40.8	39.0	6.9	4.3	5.6
117-H72								100	72			25.4	46	10	27	19	7	17	12	40.9	40.0	40.5	7.3	3.8	5.6
134-O	0	100	0	Rosin	0	1.7	0.48	Control		64.6	.0047	38.1	59	510	191	351	...	...	...	80.0	73.2	76.0	9.0	4.7	6.9
134-H72								100	72			27.7	43	1	46	2.8	0.2	2.4	1.3	35.2	32.8	34.0	8.9	4.0	5.5
135-O	0	100	0	Rosin	0	2.0	6.12	Control		64.6	.0040	27.3	42	106	72	89	...	...	...	62.4	52.4	57.4	7.2	3.3	5.3
135-H72								100	72			23.4	36	4.9	5.8	5.4	4.6	8.1	6.4	44.8	37.2	41.0	6.7	3.2	5.0
TESTS ON PAPERS CONTAINING SODA PULP																									
123-O	trace	65	35	Rosin	0	0.6	19.11	Control		49.8	.0033	16.1	32	4.8	4.0	4.4	...	...	...	43.2	40.8	82.0	4.6	2.5	3.6
123-H72								100	72			15.0	30	1.4	1.6	1.5	29	40	35	35.6	33.2	34.4	4.7	2.5	3.6
124-O	trace	50	50	Rosin	0	0.8	19.99	Control		65.9	.0054	13.4	20	2.4	1.9	2.2	...	...	...	52.2	53.2	52.7	4.3	2.3	3.3
124-H72					0			100	72			12.3	19	1.0	1.0	1.0	42	53	48	47.0	45.0	46.0	4.2	2.1	3.2
147-O	0	35	65	Rosin	0	0.6	17.25	Control		61.2	.0034	20.7	34	15.7	5.6	10.7	...	...	...	41.2	33.6	37.4	5.8	2.8	4.3
147-H72								100	72			19.6	32	9.2	3.9	6.6	59	70	64	44.4	32.4	38.4	5.5	2.7	4.1
148-O	0	75	25	Rosin	0	1.9	5.04	Control		66.2	.0052	19.4	29	15.3	7.6	11.5	...	...	...	66.4	58.8	62.6	4.9	2.4	3.7
148-H72								100	72			18.5	28	3.6	3.7	3.7	24	49	37	36.4	55.6	46.0	4.7	2.4	3.6
152-O	0	25	75	Rosin	0	1.1	15.55	Control		59.1	.0040	20.1	34	8.9	6.5	7.7	...	...	...	41.2	39.2	40.2	5.9	3.1	4.5
152-H72								100	72			19.6	33	5.6	4.9	5.3	63	75	69	39.6	36.4	38.0	5.7	3.2	4.5

[1] Approximately pounds per square inch.

samples are inclined towards the yellow, that is, they are deficient in the blue reading. The new white rag half-stocks and purified wood fibers, with the exception of No. 18, are examples of relatively good whites; on the other hand, the soda pulps are poor in color since the values for the reflection coefficients diverge considerably and they are relatively low on the brightness scale. An approximate indication of the total brightness of the samples, that is, brightness for white light, is obtained by arbitrarily averaging the reflection coefficients for red, green and blue[19]. The color characteristics of the various samples of a particular group of paper-making fibers seem to be fairly typical for that particular group. For convenience, these results have been composited and are expressed graphically in Fig. 7. Those samples represented by curves approaching closest to a horizontal position indicate those which are best in respect to non-selective reflection and thus the best whites. Relative brightnesses are indicated by the positions of the curves on the vertical scale. Color reversion, or the decrease in brightness caused by accelerated aging is represented in very nearly the correct proportion on the diagram by the distance between the green values for the original and for the heated sample.

Wood pulps prepared by the ordinary pulping processes (i. e., sulphite and soda pulps) are much more seriously affected by the heat treatment than either the rag half-stocks or purified wood

[18] Pfund, A. H., A New Colorimeter for White Pigments and Some Results Obtained by Its Use. American Society for Testing Materials, June, 1920.

[19] In order to determine the true brightness for white light, readings would either have to be taken without the colored glasses or proper weights would have to be attached to the red, green and blue readings before they were averaged. The excitation value for blue is extremely small as compared to green and red.

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fibers. The used white rag half-stocks of high grade, although of a somewhat poorer initial color than half-stocks prepared from new rags, do not appear to revert in color to any greater extent than the latter do. Purified wood fibers apparently retain their excellent initial color characteristics after the heating as well as high grade rag fibers. Soda pulps appear to be somewhat more stable than the ordinary sulphite pulps in this respect.

(2) Micro-Examination of Heat-Treated Fibers[39].—It was thought that the degradation of the color and other properties of cellulose fibers might be indicative of the physical breaking of the individual fibers; and that some evidence of the change in physical structure might be obtained by examining the fibers microscopically before and after the 72-hour period of high-temperature treatment.

Accordingly, slides of typical fibers, both original and heated, were made up, and examined at magnifications of 100, 200, 400 and 800 diameters. No difference, however, appeared between the untreated and the heat-treated fibers in any case. The fibers remained as unbroken after treatment as they were originally, and no structure changes could be observed.

2. Papers

(a) *Durability and Permanence Characteristics—*

(1) General Consideration of Strength Tests Applied to Papers.—All the commonly-applied strength tests were made on original and artificially-aged papers in order to compare their relative qualities of durability and permanence; that is, folding endurance, tearing strength, bursting strength and tensile strength. The results obtained on each of the papers are given in Table 5.

The folding endurance is generally considered the most valuable of the above tests in judging the probable durability of resistance of a paper to continued handling. Not only is the test indicative, in a general way, of the distinctive qualities of basic fibers in the papers, but its remarkable sensitivity to heat, or other arbitrary aging tests, makes it a valuable means of classifying papers as to their probable permanence. Apart from the important effect of the quality of the basic fibers on the folding endurance of papers, the test is also influenced, in large part, by the treatment given the fiber. By referring to Table 5 it may be seen that the sulphite papers there represented vary from a few folds up to nearly 500 folds, despite the fact that the variations in qualities of the pulps used for these papers were probably relatively slight. Among the rag papers even greater variations in folding endurance occur because of a greater variance among the factors affecting this test, which, aside from quality and purity of basic fiber, are treatment in the beater, method of sizing and quality of sizing materials, method of drying paper, etc.

The tearing test is probably more specifically influenced by the strength of fibers in the paper than any of the other tests. On referring to the tests made on papers before and after being surface-sized with glue, it will be observed that while the folding endurance, bursting and tensile strength are all increased ma-

[39] Examinations made by R. E. Lofton, Associate Physicist, Bureau of Standards.

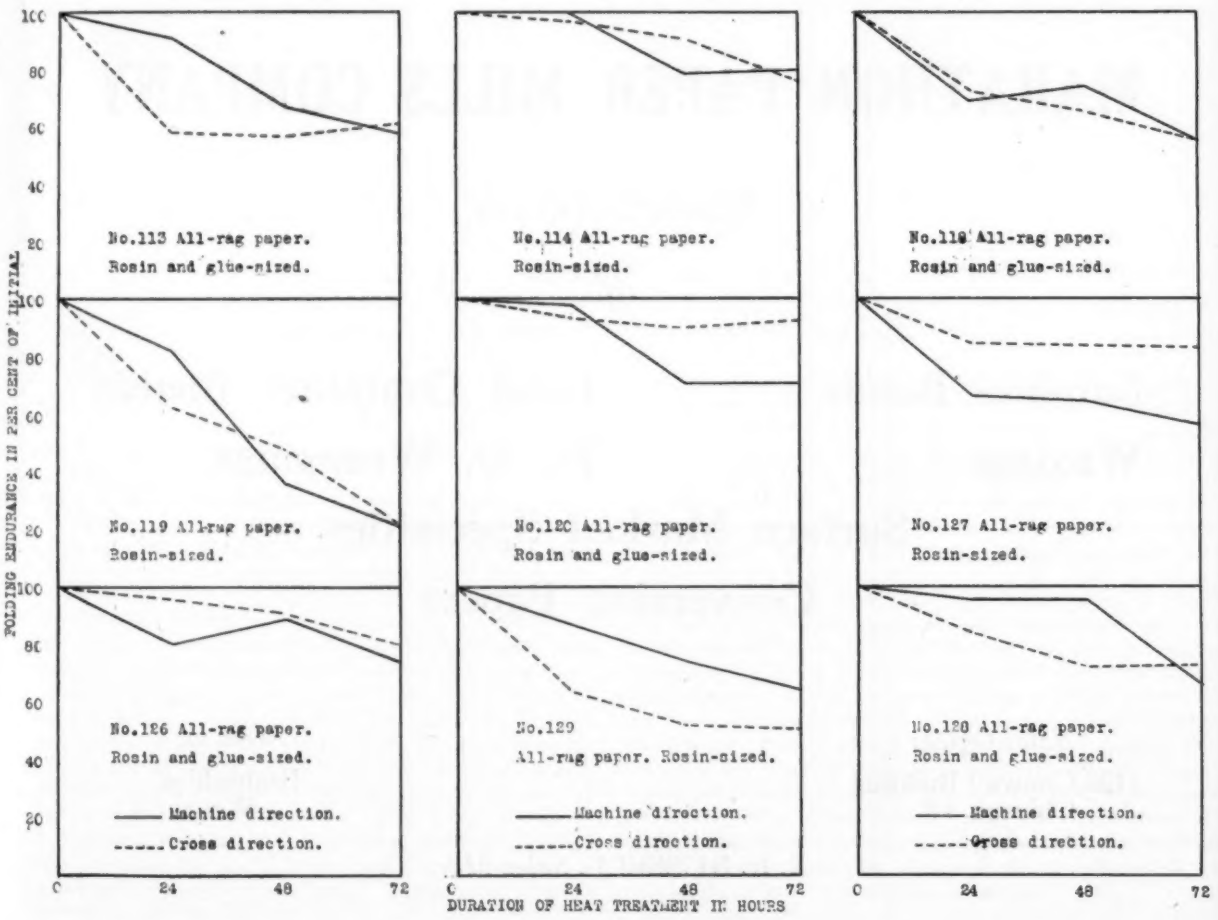

FIG. 8

Effect of duration of heat treatment on folding endurance of papers.

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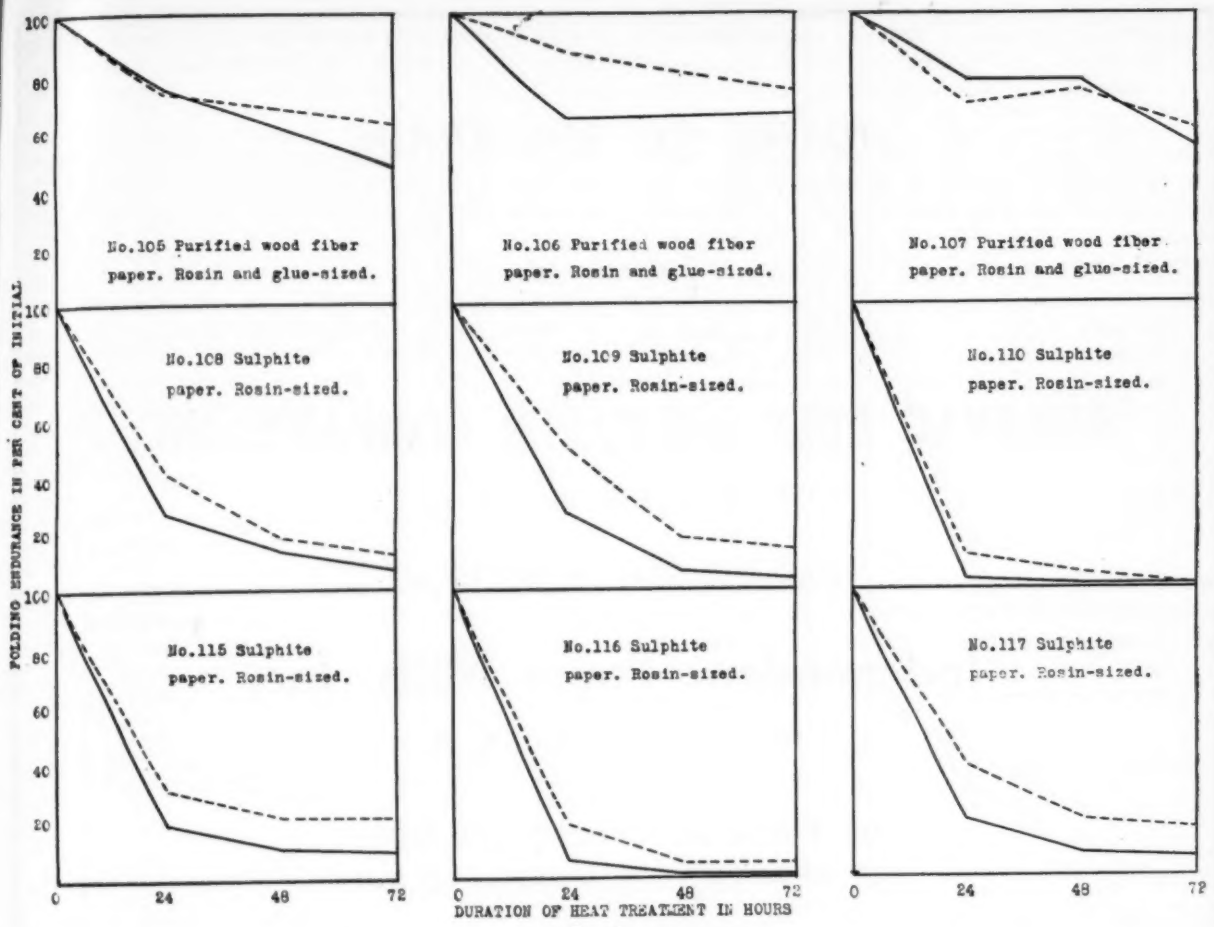

FIG. 9

Effect of duration of heat treatment on folding endurance of papers.

terially by the glue, the tearing strength is not. The tearing test is of further interest in this work because of its sensitivity to the aging test. Artificially-aged papers drop in tearing strength very sharply on being heated for 72 hours at 100 C, although not to the same extent as they do in folding endurance. It is interesting to note that a fair degree of correlation exists between the decrease in folding and the decrease in tearing strength resulting from the aging test.

Neither the bursting strength nor the tensile strength of papers is markedly affected by the heat treatment, except in cases where the papers are conspicuously of impermanent character, or in some cases, where the values may be said to be fictitious, in a sense, due to an abnormal amount of strength imparted by glue sizing.

(2) Discussion of Accelerated Aging Tests.—As a result of preliminary investigations of several types of accelerated aging tests, the usual one, in which the sample to be aged is placed in an oven maintained at 100 C for a given length of time, was found to be satisfactory and in general the most convenient. In Table 5 strength values are given for papers which have been subjected to the heat test for 24, 48 and 72 hours. The effect of varying the duration of heat treatment on folding endurance is expressed graphically in Figs. 8, 9, and 10 as per cent of initial folding endurance retained at the end of each period of exposure. A study of the curves indicates that a 72-hour period of heating is probably more desirable than a shorter period. At the end of 24 hours of heating the sharpest decrease in fold takes place, especially among the less permanent types of papers, but reaches a more constant value between 48 and 72 hours. Therefore, the per cent of initial folding endurance retained after a heat treatment of 72 hours at 100 C is considered the "permanency factor" of a given paper.

Another accelerated aging test, in which papers were exposed to a temperature of 95 C for 72 hours in an atmosphere of humidified air, was tried for different types of papers. Except for being somewhat less drastic than the latter, the relative effects were the same and therefore, the test was abandoned.

A third type of test that was tried consisted of exposing the sample to be aged to the action of steam at atmospheric pressure for two hours. This two-hour treatment was found to be sufficient to cause a considerable reversion in the colors of the papers. It was found to be difficult to reproduce test results of papers aged in this manner probably due to the fact that any condensate unavoidably dropping on the sheet, and thus moistening it, would tend to give higher strength values. Glue-sized papers of all types drop in fold to about the same extent as a result of the steam exposure as they do when heated in dry air at 100 C for 72 hours. Rosin-sized papers having no surface-sizing of glue appear to be relatively much less drastically affected. Similar steam treatments made on paper-making fibers of all types caused no decrease in the alpha cellulose of even the most impermanent of the fibers; therefore, it is probable that this type of artificial aging does not simulate the effects of natural aging nearly so truly as the ordinary heat test first considered.

(3) Detailed Discussion of Results Obtained with Various Papers.—The book papers made from mixtures of soda pulps and sulphite pulps are considerably different from the other types of

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papers studied in that they have been made more with regard to printing qualities than for high strength or durability. They were included in this investigation for the purpose of learning more about the particular properties imparted to papers by the soda pulp fiber. The test results given in Table 5 show that, while these papers are characterized by relatively very poor strength properties, they show a surprising resistance to the effects of artificial aging on these properties. In all cases the bursting, tearing and tensile strengths are not altered to any marked degree by the heat treatment, and the retention of folding endurance is very high as compared to ordinary sulphite bond papers. The fact that papers of this type react to the aging test in the manner of fairly permanent papers may be due to several causes: first, the study of paper-making fibers indicated that soda pulps of sufficiently high alpha cellulose content may be considerably more permanent, chemically, than the ordinary wood fibers prepared by the sulphite process; second, the book papers here studied contain large amounts of filler, which is thought to favor permanency; third, they are practically all lightly sized, containing small amounts of rosin as compared to the other types of papers being studied.

Referring again to Table 5 it will be observed that the ordinary sulphite bond and writing papers vary considerably in folding endurance from very low (samples 108-0 and 109-0) to fairly high (samples 110-0, 116-0 and 134-0). These variations may be due partly to differences existing in the quality of the basic fibers used, but are probably more largely due to the manner in which the fibers have been handled in the beater and on the paper machine. The strength properties of this class of papers are seen to be very sensitive to aging. The fact that the 72-hour heat treatment has left the papers extremely weak in folding endurance, while the tearing and bursting strengths have decreased decidedly is considered fairly good evidence that they are quite definitely unsuited for purposes where a high degree of permanence is required. The variations among these papers in relative permanence are undoubtedly caused, in part, by differences existing in the chemical purity of the basic fibers and also unlike sizing conditions. The results, however, indicate that two other factors may be involved to some extent. It will be noted that the samples having relatively high initial strength characteristics, such as might be found in highly hydrated papers, are those which are the least permanent. Thus, samples 110-0, 116-0 and 134-0, which have folding endurances of 389, 433 and 351, retain but 1, 3 and 1.3 per cent of this initial fold after 72 hours of heating at 100 C. On the other hand, samples 108-0 and 109-0, of markedly low original folding endurance, retain 10 and 9 per cent after the aging test. Aside from excessive hydration as a probable cause of deterioration, the presence of filler in the paper appears to have a beneficial effect. The papers containing filler, indicated by high ash content, all seem to be more resistant to the aging test than other papers containing no filler.

Three purified wood fiber papers, surface-sized with glue and otherwise prepared in a manner similar to high grade rag papers, were available for this study. All these samples are characterized by very high strength qualities and in every respect appear to be

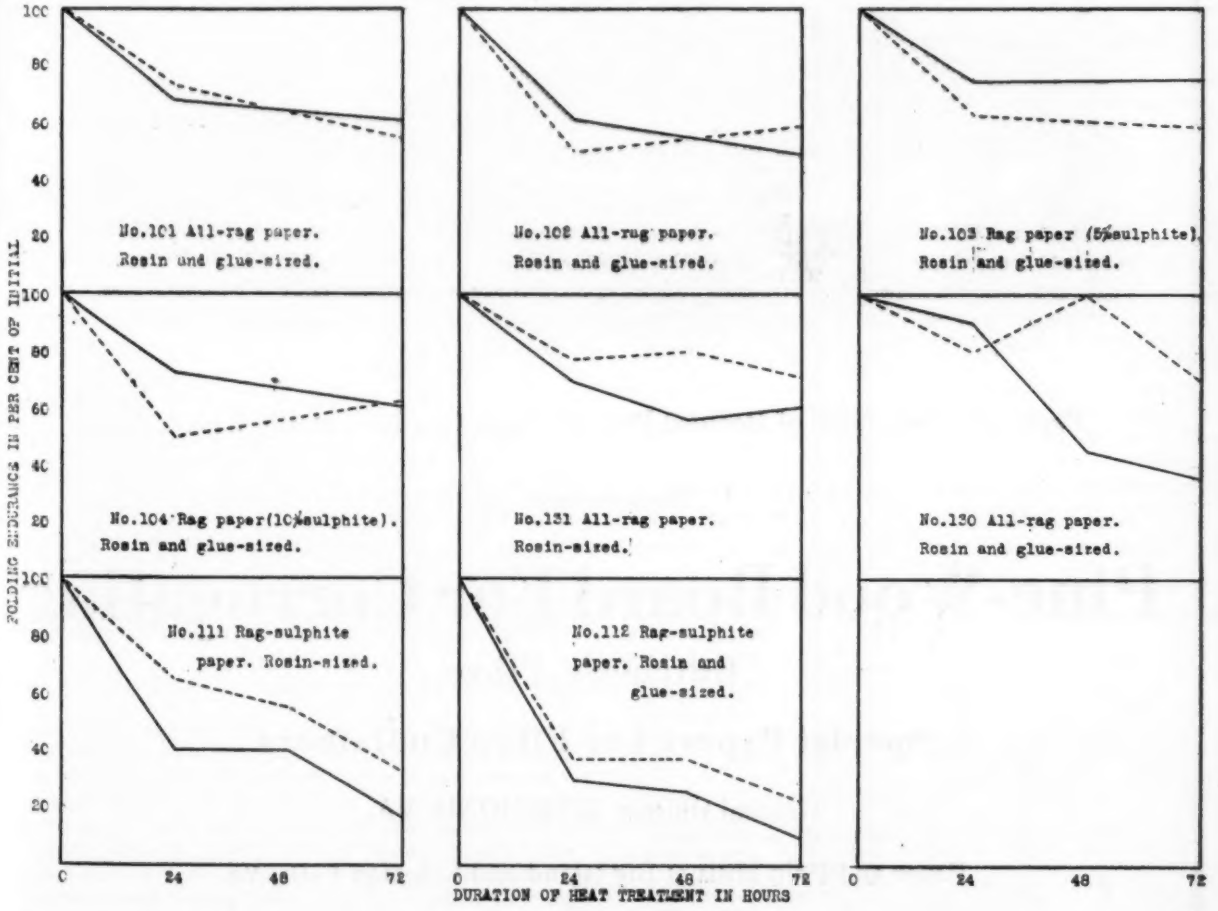
FOLDING ENDURANCE IN PER CENT OF INITIAL
No.101 All-rag paper. Rosin and glue-sized.
No.102 All-rag paper. Rosin and glue-sized.
No.103 Rag paper (5% sulphite). Rosin and glue-sized.
No.104 Rag paper(10% sulphite). Rosin and glue-sized.
No.131 All-rag paper. Rosin-sized.
No.130 All-rag paper. Rosin and glue-sized.
No.111 Rag-sulphite paper. Rosin-sized.
No.112 Rag-sulphite paper. Rosin and glue-sized.
0
24
48
72
DURATION OF HEAT TREATMENT IN HOURS

FIG. 10

Effect of duration of heat treatment on folding endurance of papers.

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entirely distinct in character from papers prepared from ordinary sulphite fibers. This superiority is particularly marked in regard to the folding endurance and the retention of this quality after the aging test. Sample 106-0 appears to combine best the qualities of durability and permanence, having an initial folding endurance of over 2,000 and losing but 29 per cent of this as a result of the 72-hour heat treatment. Sample 122 is a waterleaf paper made from purified wood fiber and is used for the preparation of cellulose esters. It was included in this study in order to determine the permanence of this type of fiber to which no sizing materials or other foreign substances affecting permanence had been added. The fact that the folding endurance suffers no appreciable change on being heated indicates a very high degree of permanence for this type of fiber.

The so-called part-rag papers consist of mixtures of rag fiber and appreciable amounts of sulphite pulp. Samples 103-0 and 104-0 while included under this classification in Table 5 because of the small amount of sulphite fiber which they contain, are not representative of this class of papers. The wood fiber probably entered as "broke" in the beater. The other papers containing 35 and 40 per cent sulphite pulp appear to have incorporated with them rag fibers that are relatively poor in strength and permanence qualities. None of these latter papers appears to be markedly superior to the better grades of ordinary sulphite bonds.

A considerable variety of all-rag papers were available for study and with few exceptions they have very good strength characteristics. Samples 130-0 and 131-0, which are particularly poor in folding endurance, were prepared from a "No. 1 White" grade of old rags. Sample 121-0 is a waterleaf paper, the fiber of which was undoubtedly not beaten with regard to strength qualities, used for the preparation of cellulose esters. The fact that its initial fold is not affected by the aging test indicates that the basic fiber is of very high permanence. The number of rag papers sampled before and after the size tub affords an opportunity to study the effect of glue sizing on the various properties of papers. Referring to Table 5 it will be seen that the glue has increased the bursting and tensile strengths substantially, the folding endurance to a widely varying extent and decreased the tearing strength somewhat. As for the effect of glue on qualities of permanence,

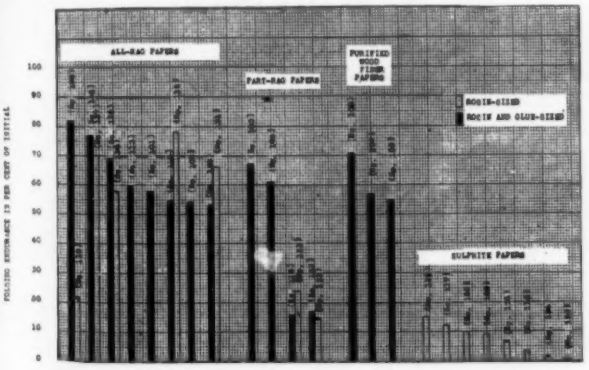

FIG. 11

Effect of artificial aging on the folding endurance of different types of papers.

it is indicated that strength imparted by excessive use of this sizing material is quickly lost upon heating. Referring to samples 101-0, 102-0 and 118-0, all of which have high glue contents, it is noteworthy that the bursting strength of each of these papers, initially very high, is appreciably less for samples that have been heated 72 hours at 100 C. Even the tensile strength shows a definite tendency to drop which is unusual for permanent papers. That considerable folding strength has been imparted to sample 118-0 by the use of glue is indicated by the fact that its initial folding endurance is about five-fold that of the unsized paper corresponding to it, 114-0. This does not necessarily mean that glue sizing has an adverse effect upon the permanency of papers, in fact the reverse may be true. Samples 126-0 and 128-0 represent papers having folding endurances substantially the same as the unsized papers corresponding to them, 127-0 and 129-0. In these cases the surface-sized papers have a considerably better resistance to the effects of the heat treatment than the unsized papers, indicating that the glue has exerted a protective effect upon the fibers.

In Fig. 11 a graphical representation of the comparative per-

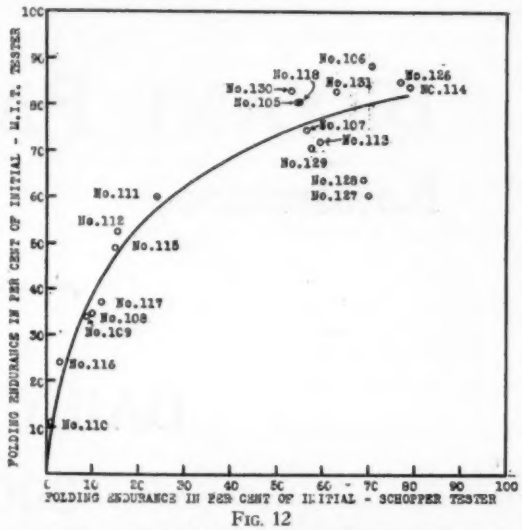

FIG. 12

Effect of artificial aging on folding endurance of papers. Schopper tester vs. M.I.T. tester.

manence of different types of papers, as determined by the per cent retention of folding endurance after the standard heat treatment of 72 hours at 100 C, is given. The purified wood fiber papers react to the aging test in much the same manner as the high grade rag papers and therefore, it can reasonably be assumed that the resistance of these papers to the deterioration caused by natural aging would be of the same order. A comparison of the two types of papers from the standpoint, strength qualities or durability, is made difficult due to the fact that only a limited number of purified wood fiber papers were available. While some of the rag papers test considerably higher in tearing strength and folding endurance, it cannot be stated definitely, from the results tabulated, just how optimum papers prepared from the two fibers would compare. In order to make a more reliable comparison of the relative strength qualities possible to attain in papers made from these two fibers, a sample of a bond paper made from high-

TABLE 6

COMPARISON OF RAG AND PURIFIED WOOD FIBER PAPERS MADE IN THE SAME MILL

Sample Number	155-0	155-H72	106-0	106-H72
Type of Paper	Rag		Purified Wood Fiber	
Rosin, per cent	2.5		1.5	
Glue, per cent	3.68		2.36	
Weight (500 sheets 25 by 40 inches) pounds	53.7		57.3	
Thickness, inches	.0039		.0038	
Aging test	Control sample	Sample heated 72 hours at 100 degrees C.	Control sample	Sample heated 72 hours at 100 degrees C.
Ratio, bursting strength to weight, per cent	106	98	87	80
Folding endurance:				
Machine direction, double folds	2821	1622	2465	1635
Cross direction, double folds	2273	1479	1560	1170
Fold retained after heating, per cent	....	61.4	....	70.6
Tearing strength:				
Machine direction, grams	103	92	79	78
Cross direction, grams	101	84	76	66
Tensile strength:				
Machine direction, kilos	9.6	9.6	10.3	10.2
Cross direction, kilos	6.2	5.8	5.2	5.3

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grade new white rags was requested from one of the manufacturers of the purified wood fiber papers. The methods used in the preparation of the two types of papers were stated to be, as far as possible, identical in all particulars possible to control. The results are given in Table 6. The wood fiber paper is about 20 per cent lower in folding endurance, bursting strength and tearing strength and equal in tensile strength, whereas it appears to be somewhat superior to the rag paper in the retention of these qualities. The rag paper has a 50 per cent higher glue content which may have some effect on its strength qualities relative to the purified wood fiber paper.

In Fig. 12, the relation between the permanency factors (per cent retention of folding endurance after 72 hours of heating at 100 degrees C) of typical papers, as determined at the Bureau of Standards and by an outside laboratory, is expressed graphically. At the Bureau the Schopper folding tester was used and the tests made at 65 per cent relative humidity. The other laboratory employed the M. I. T. folding tester at 45 per cent relative humidity. There appears to be a fair degree of correlation between the two sets of results, indicating that the effects of the accelerated aging test are duplicable.

(b) *Color Characteristics.*—The color characteristics of the various papers, reported in Table 7, are seen to have been markedly influenced by the color properties of the fibers from which these papers were made. In the study of wood pulps and rag half-stocks, it was found that the sulphite pulps reverted the most in color as a result of the 72-hour heat treatment at 100 C. Similarly, the papers prepared from sulphite pulps are the most susceptible to reversion in color; both in respect to decrease in total brightness and in departure from true white, which latter manifests itself as a relative increase in the predominating tint, red. Next in order of susceptibility to reversion in color are the papers prepared from mixtures of sulphite pulps and rag fibers, then the book papers prepared from mixtures of sulphite pulps and soda pulps and finally, purified wood fiber papers and high grade rag papers, which latter two appear to be about equal in color stability. In general, it is evident that papers which are impermanent in chemical or other physical properties will also tend to discolor readily. Considering the sulphite papers alone, it is apparent that the three of marked impermanence in regard to loss of physical strength after aging, stand out as the papers reverting most in color.

TABLE 8
ERASURE TESTS

Sample No.	Description	Basic weight 25x40, 500 pounds	Rosin per cent	Glue per cent
113	100 per cent rag bond. Rosin and glue-sized	66.1	1.53	2.46
107	100 per cent purified wood fiber bond paper. Rosin and glue-sized	69.3	1.24	2.19
106	100 per cent purified wood fiber bond paper. Rosin and glue-sized	57.3	1.53	2.36
105	100 per cent purified wood fiber bond paper. Rosin and glue-sized	56.2	1.41	2.74
120	100 per cent rag bond. Rosin and glue-sized	66.4	1.35	2.17

Another effect apparent in the color characteristics of the papers may be mentioned. Referring to the results obtained for rag papers, it will be observed that the glue-sized papers tend to be more sensitive to color changes than similar papers sampled before the size tub.

(c) *Erasing Quality of Bond Papers Made from Rag Fibers and from Purified Wood Fibers.*—Tests were made relative to the erasing quality of rag papers as compared with that of certain purified wood fiber papers. In order to obtain some preliminary information on this subject two papers prepared from the highest grade of rag half-stock were subjected to erasure tests and compared, in this respect, with three available papers prepared from purified wood fibers. They were rosin and glue-sized and contained approximately the same amounts of these sizing materials. A description of the test procedure used follows.

Straight lines were drawn with a ruling pen using standard testing ink and using a more or less average width line as in normal pen writing.

The quality of each consecutive line drawn after the erasure of the middle portion of the original line was noted, and the sum total of the repeated erasure of lines drawn in the same place till the rubbing through of the sheet occurred, was used as a basis for comparison of samples. The reason for erasing only the middle portion of each line is to leave the ends as a guide for the new line after each erasure. The above test is checked for each sample to insure accuracy.

The surface of the paper after erasure also is noted and has some bearing on the decision of relative merits.

The faults noted were feathering of the pen lines and a skipping of the ink on the lines.

All of the papers were found to have good erasing quality. The test data are given in Table 8 in order of the relative rank-

TABLE 7.—COLOR STABILITY OF VARIOUS COMMERCIAL PAPERS

Sample Number	Brightness value of control sample: Blue	Green	Red	Total brightness	Brightness value of sample heated at 100 degrees C. for 72 hours: Blue	Green	Red	Total brightness	Decrease in brightness value due to heating: Blue	Green	Red	Total decrease	
ALL-RAG PAPERS													
113	0.72	0.84	0.89	0.82	0.67	0.81	0.88	0.79	0.05	0.03	0.01	0.030	
118	0.71	0.78	0.85	0.78	0.66	0.74	0.82	0.74	0.05	0.04	0.03	0.040	
120	0.75	0.81	0.86	0.81	0.71	0.78	0.85	0.78	0.04	0.03	0.01	0.027	Rosin and tub-sized
126	0.75	0.84	0.89	0.83	0.72	0.83	0.89	0.81	0.03	0.01	0.00	0.013	
128	0.75	0.85	0.90	0.83	0.69	0.83	0.89	0.80	0.06	0.02	0.01	0.030	
130	0.76	0.83	0.87	0.82	0.73	0.81	0.87	0.80	0.03	0.02	0.00	0.017	
114	0.81	0.86	0.92	0.86	0.78	0.85	0.91	0.85	0.03	0.01	0.01	0.017	
119	0.73	0.79	0.84	0.86	0.68	0.75	0.82	0.75	0.05	0.04	0.02	0.037	
127	0.78	0.87	0.91	0.85	0.72	0.86	0.91	0.83	0.06	0.01	0.00	0.023	Rosin-sized
129	0.78	0.87	0.91	0.85	0.73	0.86	0.91	0.83	0.05	0.01	0.00	0.020	
131	0.79	0.85	0.89	0.84	0.72	0.83	0.89	0.81	0.07	0.02	0.00	0.030	
PART-RAG PAPERS													
112	0.72	0.74	0.82	0.76	0.64	0.72	0.80	0.72	0.08	0.02	0.02	0.040	
132	0.69	0.74	0.79	0.74	0.60	0.71	0.78	0.70	0.09	0.03	0.01	0.043	Rosin and tub-sized
104	0.72	0.78	0.82	0.77	0.67	0.76	0.82	0.75	0.05	0.02	0.00	0.023	
111	0.71	0.75	0.80	0.75	0.61	0.73	0.80	0.73	0.10	0.02	0.00	0.040	Rosin-
133	0.73	0.77	0.81	0.77	0.64	0.73	0.80	0.72	0.09	0.04	0.01	0.047	sized
PURIFIED WOOD FIBER PAPERS													
105	0.75	0.82	0.86	0.81	0.70	0.80	0.86	0.79	0.05	0.02	0.00	0.023	
106	0.71	0.76	0.81	0.76	0.68	0.75	0.81	0.75	0.03	0.01	0.00	0.013	Rosin and tub-sized
107	0.73	0.77	0.82	0.77	0.70	0.75	0.81	0.75	0.03	0.02	0.01	0.020	
SULPHITE PAPERS													
108	0.75	0.80	0.84	0.80	0.66	0.76	0.83	0.75	0.09	0.04	0.01	0.047	
109	0.73	0.79	0.84	0.79	0.64	0.75	0.83	0.74	0.09	0.04	0.01	0.047	
110	0.73	0.77	0.82	0.77	0.61	0.71	0.80	0.71	0.12	0.06	0.02	0.067	
115	0.70	0.77	0.83	0.77	0.65	0.74	0.82	0.74	0.05	0.03	0.01	0.030	Rosin-sized
116	0.71	0.76	0.81	0.76	0.60	0.72	0.80	0.71	0.11	0.04	0.01	0.053	
117	0.72	0.78	0.83	0.78	0.63	0.77	0.83	0.74	0.09	0.01	0.00	0.033	
135	0.75	0.86	0.90	0.84	0.65	0.79	0.88	0.77	0.10	0.07	0.02	0.063	
SULPHITE-SODA PAPERS													
123	0.74	0.82	0.87	0.81	0.69	0.80	0.87	0.79	0.05	0.02	0.00	0.023	
124	0.75	0.84	0.89	0.83	0.72	0.83	0.89	0.81	0.03	0.01	0.00	0.013	
147	0.68	0.74	0.83	0.75	0.61	0.72	0.82	0.72	0.07	0.02	0.01	0.033	Rosin-sized
148	0.69	0.77	0.86	0.77	0.61	0.74	0.85	0.73	0.08	0.03	0.01	0.040	
152	0.65	0.79	0.87	0.77	0.61	0.77	0.87	0.75	0.04	0.02	0.00	0.020	

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TABLE 9
DECREASE IN ALPHA CELLULOSE CONTENT OF PAPERS ON HEATING FOR 72 HOURS AT 100 DEGREES C.

Sample number	Alpha Cellulose Content: Control sample per cent	Sample heated 72 hours at 100 degrees C., per cent	Amount of initial alpha cellulose lost per cent
	All-Rag Papers		
119	90.7	85.2	6.0
120	91.0	89.7	1.4
114	97.5	96.5	1.0
118	89.1	88.6	0.6
	Part-Rag Papers		
111	79.8	73.6	7.8
112	78.9	73.9	6.3
133	77.7	73.3	5.7
132	78.1	74.4	4.7
	Purified Wood Fiber Papers		
105	86.8	85.8	1.1
106	85.3	83.7	1.9
107	85.3	83.7	1.9
	Sulphite Papers		
108	76.1	71.8	5.7
110	79.3	74.6	5.9

ing of the papers in respect to resistance to erasing, No. 113 being considered the best and No. 120 the poorest.

The data indicate that high-grade rag papers, and papers prepared from purified wood fibers, withstand erasure to about the same extent. The probabilities are that fiber composition has only a minor influence on this particular quality of paper and that other factors entering into its manufacture (for example, quality and amount of sizing materials and treatment of fibers in the beater) have a much more important effect.

(d) *Alpha Cellulose Content.*—The effect of the artificial aging test on the alpha cellulose content of some typical papers is given in Table 9. Referring to Table 5 it is evident that there is a correspondence between the decrease in folding endurance and the decrease in alpha cellulose content. For example, the sulphite papers and those prepared from mixtures of sulphite pulp and rags which dropped markedly in folding endurance when heated for 72 hours at 100 C, revealed a corresponding instability in alpha cellulose content; on the other hand, the purified wood fiber papers and all-rag papers of relatively good permanence lost less than 2 per cent. To illustrate the effect on an all-rag paper of poor permanence, sample 119-0 which retained but 21.6 per cent of its initial folding endurance after the heat treatment, dropped 6.0 per cent in alpha cellulose. It may be noted that the surface-sized papers are more stable in this respect than similar papers sampled before the size tub, suggesting, as was indicated before, that the surface coating of glue may actually assist the aging qualities of a paper.

VI. Relative Cost of Purified Wood Fibers and Rag Half-Stocks

The price of the purified wood fibers ranges from 5.5 to 8 cents a pound; the latter being the price for the best papermaking grade.

The cost of rag half-stock (which is at the same stage in the paper-making process as wood pulp) includes the price of the raw material, the rags; the conversion cost, that is for sorting, dusting, cooking with alkali, bleaching and washing; and the increased cost due to the shrinkage or loss of fiber in the process. The price of cotton rags varies considerably according to the quality. At present new white shirt cuttings command 11 to 11.5 cents; old, No. 1 white rags, 5.5 to 6 cents; and poorer grades such as "twos and blues" about 3 cents. According to certain experimental data available here, the conversion cost per pound of finished half-stock is about 2.5 cents. The yield of half-stock varies with the quality of the rags from about 80 per cent to 65 per cent (see The Manufacturer of Pulp and Paper, Vol. 4, page 37, sec. 1. McGraw-Hill Book Company, Inc., 1924). The higher yield is said to be representative for new white shirt cuttings.

The total estimated cost of various half-stocks would be, then:

New white shirt cuttings .....16.5 cents
Old, No. 1 white rags .....10 cents
"Twos and blues" ..... 7 cents

It is to be understood that these figures are approximate and that costs will vary from mill to mill.

VII. Further Work

1. A method is very much needed for identifying purified wood fibers in papers. A satisfactory estimation of the purified fibers in the presence of sulphite fibers can not be readily made by means of any of the stains commonly used in fiber analysis work. An attempt is being made to devise some stain which will differentiate these fibers.

2. It has been noted that the non-alpha cellulose constituents of different types of fibers vary, weight for weight, in the extent to which they influence deterioration. It is indicated that certain substances such as pentosans are comparatively inert while the modified celluloses are very active in causing further degradation. It is proposed to study further the relative effects of these different impurities.

3. A considerable amount of preliminary work has been done indicating that the fluidity in cupra-ammonium solution may offer a ready means of measuring important qualities in paper making fibers. Further work is planned to correlate such data with data on the strength and permanence qualities of papers.

4. Work on papers prepared in the Bureau of Standards paper mill, as outlined earlier in this report will be started in the near future.

5. Before concluding the work on the present series of commercial papers, additional samples will be tested for alpha cellulose content, copper number and acidity. The effect of artificial aging on these properties will also be determined.

VIII. Summary and Conclusions

The qualities of purified wood fibers, and commercial papers prepared from these fibers, have been investigated from the standpoint of chemical purity, color, durability and permanence; and compared with other typical papers and paper-making fibers.

The interest in the purified wood fibers lies, not only in their value for high quality bond and writing papers, of the grade hitherto made entirely from rag fibers or mixtures of rag and sulphite fibers, but also very largely in their permanence qualities and thus the possibility of using them to supplant the higher priced rag fibers in permanent record or other papers in which durability must be maintained over centuries.

In order to simulate as closely as possible the deteriorating effects of natural aging, and thus determine the probable relative permanence of various types of papers and paper-making fibers, accelerated aging treatments, involving the exposure of samples to an elevated temperature, were made and the extents of physical and chemical degradation compared. It is not known how accurately such tests can reproduce the effects of natural aging; however, it seems reasonable to suppose that materials possessing a high degree of stability toward the heat test would be correspondingly more permanently durable than those which manifested greater changes in chemical and physical properties.

The data obtained thus far point to the following general conclusions:

1. Accurate evaluations of the quality of papers or of the suitability of a pulp or half-stock for conversion into a given type of paper must be based on observations as to their performance under specified tests. Fiber composition can not be taken as a criterion of the excellence of a paper. The all-rag papers and wood fiber papers which have been studied both cover similar wide ranges of durability and permanence.

2. While it is desirable that the alpha cellulose content of a paper-making fiber intended for permanent uses should be as high as possible, conclusions based on this determination alone may be in error due to the fact that the non-alpha cellulose constituents of different types of fibers vary, weight for weight, in the extent to which they influence the permanence qualities of these fibers. Modified celluloses are known to be active in causing rapid

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deterioration of cellulose; pentosans, on the other hand, appear to be relatively inert in this respect.

3. The decrease in the alpha cellulose content of a cellulose material caused by artificial aging is considered an indication of relative permanence. Purified wood pulps resemble the best grade of rag half-stock in suffering but slight changes in alpha cellulose after an exposure to a temperature of 100 degrees C. for 72 hours. In this respect purified wood fibers are considerably superior to poorer grades of rag fibers, such as old, No. 1 white rag half-stocks.

4. Changes in the alpha cellulose content of papers brought about by artificial aging are accompanied by fairly proportionate changes in physical properties, such as folding endurance and tearing strength. It is therefore probable that the paper-making wood pulps and rag half-stocks which drop appreciably in alpha cellulose on heating would be unsuited for conversion into permanent types of papers.

5. Purified wood fibers have excellent color characteristics, comparing favorably with half-stocks prepared from the best grades of new white rags. Since they are relatively very resistant to the effects of artificial aging, it is indicated that they would show similar good resistance to the yellowing effects of natural aging.

6. Ordinary grades of sulphite pulps must be considered unsuited for conversion into highly permanent types of papers. Although such papers may have a degree of durability sufficient for most purposes, the character of the impurities present in the fibers is such as to cause relatively rapid deterioration and a consequent decrease in the initial strength qualities.

7. The better grades of soda pulps and the papers prepared from them appear to be considerably more permanent than the ordinary sulphite pulps and papers. It is probable that high-grade soda pulp may be safely used in certain printing and book papers where high strength qualities are not essential, but where a fair degree of permanence is required.

8. A high degree of hydration appears to be detrimental to the permanence of a paper.

9. Mineral fillers may be safely added to furnishes for permanent papers, and probably aid to some extent in preventing deterioration.

10. High strength imparted by glue sizing is rapidly lost when the paper is heated. It is probable, however, that the surface coating of glue protects the individual fibers from deterioration somewhat by retarding oxidation, and thus increases the permanency of the paper.

11. The manner in which the purified wood fibers, and papers prepared from them, react to the various tests which have been applied, indicates that they are well adapted for use in high quality bond and permanent record papers, which have hitherto been made exclusively from furnishes of high-grade rag half-stock. It is hoped that the further researches in progress will lead to more definite conclusions in this respect.

Discussion on Quality of Purified Wood Fibers

CHAIRMAN BAKER: We are now ready for the discussion of this paper.

AARONSON (Picatinny Arsenal, Dover, N. J.): I have been listening to this paper and it seems to me that we might attribute the decrease in strength to another factor, namely, the degree of polymerization of the cellulose molecules which, in view of the new standardized method of the determination of viscosity could well be applied to this problem.

We consider that viscosity is a measure of the degree of the colloidal aggregation of the cellulose, of the size of the cellulose particle the Alpha cellulose itself is no measure of the strength of a pulp. It would simply give us the Alpha cellulose content as obtained by that particular method.

We could take two pulps having the identical Alpha cellulose figures and they would be entirely different in strength due to the different degrees of molecular aggregation. It seems that in connection with a problem of this type we have a standardized method for determination of viscosity and that that method should be applied.

Take the three curves that he showed for rag pulp, sulphite pulp and soda pulp and as far as I can recall they seemed to follow roughly the viscosity of those pulps. That is to say, soda pulp gets a more drastic treatment that the rag pulp and has a much lower viscosity while the sulphite is in between. Therefore, the viscosity might well be an important factor in measuring the potential strength of a paper.

B. W. SCRIBNER (U. S. Bureau of Standards, Washington, D. C.): I might say that we have considered the viscosity determination that you mention. However, we felt that we had not gone far enough to say anything definite about the matter. As I remember it what work we have done on this has lead to practically the same results that we get by the age test and we have correlated them nicely. It does seem that the viscosity measurement is a very important measurement when it comes to measuring the durability of fibers. It seems to apply to paper making just as much as it does to rayon.

A. C. WALKER (Bell Telephone Company, New York): In connection with this oven that they use for making the baking test, I have been very much interested in that particular problem for the American Society for Testing Materials in an effort to standardize on such equipment.

We find from experience in a number of different laboratories that the moisture content of the air in the oven does seem to be a significant factor in determining the degree of reproducibility of results that may be obtained in baking tests.

We have made a considerable number of baking tests at an elevated temperature including some at temperatures higher than those used here and find it very difficult to reproduce them. Of course, in spite of variations you get a general perspective much like the one that has been presented here, but for a standardized test it seems rather important that several of the factors that are involved should be more carefully controlled.

I am interested to know if in the test that was used here the air was absolutely dry or if the air contained the amount of moisture that is in the prevailing humidity. It seems to me rather important and I would like to have some information on that.

ROYAL H. RASCH: No attempt was made to dry the air. However, we made certain tests with actually humidified air, and found that the results bore the same general relation.

A. C. WALKER: Your tests with humidified air were made with the open temperature at 95 degrees. As you go up from 70 to 135, which is the range over which we worked, a rise of only a few degrees does make considerable difference in the drastic attack on the paper. Therefore, I am wondering if your 95 degree test with humidified air is really as pertinent as you indicate in your paper. Wouldn't it have been worth while to have done it at 100 degrees with a humidity somewhat lower than saturation?

J. P. PRESCOTT (Collins Manufacturing Company, Holyoke, Mass.): It doesn't seem to me that the application of heat is a fair test in giving the age of the paper. From what you said previously if two papers were started with a different kind of glue one would likely last longer than would the other one, yet when you apply the heat you destroy all the properties of the glue. Therefore, if two papers were made with the same stock and one had a very poor grade of glue and the other had a high grade, the higher grade of glue would last longer. In your test they would both last the same length of time.

ROYAL H. RASCH: Of course, it would be much better if we could compare different types of paper and size exactly in the same manner. That is planned for later.

J. P. PRESCOTT: Wouldn't that glue be destroyed in the application of the heat?

ROYAL H. RASCH: Not entirely. It is indicated that where the strength is increased a great deal by the use of glue it drops very rapidly on being heated.

J. P. PRESCOTT: The glue gives it protection against the elements or the action of time. You destroy that protection don't you when you heat it?

ROYAL H. RASCH: I do not know about that.

J. P. PRESCOTT: It would seem to me that there would be a difference. I wonder if we could not reproduce time and see whether the one lasted longer than the other. According to the test used they show the same degree of longevity.

ROYAL H. RASCH: The test is unsatisfactory to some extent, but that is all we have to judge the permanence of the paper by. It appears to be more satisfactory than a number of others.

HELEN U. KIELY (American Writing Paper Company, Holyoke, Mass.): While we are speaking of glue sizing and resin sizing, I wonder how Mr. Rasch accounts for the alpha cellulose content in the glue sized sheet where it went down. If you start with the same stock and glue size it, how can you get that decrease in the alpha content? In samples 114 and 118 which you say are the same paper before and after glue sizing, you have 97.5 and 89.1 respectively for the alpha content before aging. I wonder how glue can affect such a difference?

ROYAL H. RASCH: I wondered about that myself. However, those were the results that we obtained.

HELEN U. KIELY: It doesn't seem to me that tub sizing would change the alpha content of a paper.

ROYAL H. RASCH: Of course, the glue is determined as an ordinary alpha cellulose material there and it is dissolved.

HELEN U. KIELY: I do not see how the effect of the glue could lower the alpha content, do you?

ROYAL H. RASCH: Yes, if your paper contained say five per cent glue and it was dissolved in the caustic material it would have, apparently, five per cent less of alpha cellulose.

HELEN U. KIELY: Have you any alpha papers without tub size?

ROYAL H. RASCH: No, we didn't have them available.

JESSIE E. MINOR (Rag Content Paper Manufacturers at Bureau of Standards, Washington, D. C.): I wonder whether we are fair in discussing a principle of fundamental fiber qualities and not having our samples in parallel condition. How can we draw any conclusions comparing rag and alpha fibers unless we have tests made on alpha papers without glue sizing parallel to the tests reported on rag papers without glue sizing. It seems to me that our whole discussion would be dependent upon making that comparison, both fibers without glue sizing and both fibers with glue sizing. You quote paper number 119 of all rag which lost six per cent of its alpha content by oven heating but in checking the numbers of the rest of the table, the purified wood papers quoted all have glue sizing. If we omit from this table number 119 and number 114 which have no parallel for comparison, then we find that the papers made of alpha pulp lost 63 per cent more alpha content by oven heating than did the all rag papers quoted.

C. L. WAGNER (J. O. Ross Engineering Corporation, New York): May I suggest something to those interested in the testing of papers for permanence? It seems to me that the heat test does not assimilate actual conditions because paper is very seldom heated up to 212 degrees Fahrenheit or 100 degrees Centigrade in actual use.

During the war I had some connection with chemical warfare service and from the textile trades we obtained the use of an ultra-violet lamp for testing not only textiles but rubber for aging qualities. I think possibly if the ultra-violet rays were tried out on this it might give a really fair indication of what the paper would stand and would be similar to natural conditions of light and moisture. This is, however, merely a suggestion.

B. W. SCRIBNER: In regard to this choice of test methods for this purpose, we are not very certain ourselves that heating the paper simulates a natural condition. However, the fact is that this new product purifies wood fibers is a commercial product and is being bought and sold, consequently we selected the best tools we had. We are going further and are investigating these various methods to find out more about them. That is the reason we have mentioned the fact that the methods we use and the results we have so far and the conclusions must all be regarded as merely tentative. We are, of course, very glad to have suggestions as to how we can find ways of attacking the problem and how this might be improved.

In regard to tests of the glue sized papers, we were compelled to get those from commercial mills. We asked them to give us the regular paper and the glue sized paper from the same run. We do not know whether we got that or not. Some discrepancies may have crept in in that way, but we went back beyond that and we have tested the raw materials and quite a lot of the unsized papers also. Of course, those results are more important than the results obtained on the glue sized papers.

We intend to go further and make these same tests in our own mill, make the paper, so that we will have the full history. That information will then be more conclusive.

J. PRESCOTT: I would like to remind Mr. Scribner of the fact that the violet rays have been attempted and even when they were stepped down and with the application of ice they charred the fibers.

W. S. COGGESHALL (S. D. Warren Company, Cumberland, Maine): Outside of all the results on the aging of the papers at the present moment, I am particularly interested in the fibers that were tested. There were three classes of fibers: Purified fibers, ordinary sulphite and ordinary soda. It looked bad. The alpha cellulose and the color tests as given on those three sets of samples that were tested show that the pure wood pulp runs up in the upper 90's and the alpha content runs all up and down the center of the color chart. But there are only three soda fibers tested. I notice the alpha content is all under 80 and one down in the 60's. I do not know such soda pulp myself. On the color chart the soda fibers are down in the region that I would call almost unbleached pulp.

I would merely suggest that in the continuance of this work, as I understand it is to be continued, more samples of soda fiber be included in the tests than just those three that are in on this list.

B. W. SCRIBNER: I might say that those three soda fibers were obtained from three manufacturers who are among the leaders of the manufacturers of soda pulp in the country. In fact all of these papers were secured from what we consider representative manufacturers. Of course, we do expect to get more samples and examine them.

TH. C. BENTZEN (Whiting-Plover Paper Company, Stevens Point, Wis.): There is one important question that I would like to ask. What is the difference between the folding endurance of the paper made out of the purified wood and that made out of rag? How much of the fold endurance is retained? How much is that in per cent? I mean after the paper has been heated. What is your average?

ROYAL H. RASCH: I haven't that.

T. BENTZEN: Sometime ago I made that same test. That was around June of 1928. There I have for 85 per cent rag and 15 per cent pulp common sulphite pulp, 95 per cent retention; paper made out of 25 per cent rag and 75 per cent sulphite I have 63 per cent retention. Here is somebody telling me that you have less in the 100 per cent rag, than I have in the paper that is 25 per cent rag paper. Have you no values at all on that? Which is the strongest of the two papers, the rag paper or the wood pulp paper? From your report it seems that the purified wood fiber paper, in many respects, is better than rag paper, isn't that so?

ROYAL H. RASCH: As Mr. Scribner explained, everything is rather tentative at the present time.

T. BENTZEN: I am only asking for results. Have you tested the folding?

ROYAL H. RASCH: I can only refer you to the table of results on Pages 66 and 67.

FYNCH: I think Miss Kiely has some compilations here that will answer that question.

HELEN U. KIELY: I have averaged that up from Mr. Rasch's report. I find, from his figures that the retention of fold on the 100 per cent rag is 63 per cent, for the purified wood it is 60 per cent, and on the old rags it is 53 per cent on folding. But I have made similar tests in our laboratory and my results do not check yours.

In the tests which I have made in our laboratory, I find that the retention of fold of commercial all rag papers averages 250 per cent of that of a commercial all alpha pulp ledger paper, and for a 50 per cent rag ledger paper selling at the same price as the all alpha paper, the retention of fold is practically the same as the alpha ledger. With the retention of Tear, which he says is more indicative of fiber quality, the figures are different. For all rag papers the average retention of tear is 87 per cent, for 50 per cent rag ledgers it is 76.5 per cent, and for the alpha ledger mentioned it is 55.8 per cent. For the loss of alpha content due to oven heating, I have for all rag papers 2.1 per cent, for the 50 per cent rag ledger mentioned it is 14.2 per cent and for the all alpha ledger it is 16.2 per cent. The increase of the copper number for the all rag papers is 28.5 per cent, for the 50 per cent rag papers is 49 per cent and for the alpha ledger is 77.2 per cent. Now this bunch of papers was obtained through a jobber and not picked in any way and tests were made by my routine laboratory chemists.

T. BENTZEN: I had 95 per cent fold retention on an average.

A. C. WALKER: How were they heated?

T. BENTZEN: At 100 degrees.

A. C. WALKER: What was the moisture content of the air?

T. BENTZEN: It was without moisture at all. It is the same test that was made here.

E. C. TUCKER (Crocker McElwain Company, Holyoke, Mass.): Was that on samples that had been resin sized and glue sized?

T. BENTZEN: That was paper taken out of stock.

JESSIE E. MINOR: In that test how long did you condition your sample after you took it out of the oven? Was the sample conditioned the normal one hour or did you give it a longer conditioning in the humidity room? I think that is an important point. I am referring now to the time before making the fold.

T. BENTZEN: The paper was glued down first in a container with acid to prevent it from getting moist.

JESSIE E. MINOR: Did you condition it?

T. BENTZEN: It was in there two hours or more. I did that a long time ago but it still holds good and I am going to check on that when I get back home. You shall hear from me then.

FYNCH: May I ask at what time of the year your folding test was carried out?

T. BENTZEN: That was in the fall of the year, but in Wisconsin we have a dry country anyway. (Laughter) That goes for all time too.

CARL SCHNEIDER (Allied Paper Mills, Kalamazoo, Mich.): When we speak of rags of course we classify them so that we know when we have very old rags, or medium grade, or a very high grade of rags, and I have tried for a long while to see if I could not find something, some method by which to differentiate between the different species of cotton.

I wrote once to a firm in Germany. I had a catalog of their publications. That whole thing was gotten together by Dr. Stahle. This one was called, "The Microscopic Diagnosis of Cotton." I got fooled there because the diagnosis was on the cotton botanically by the leaves principally. It diagnosed the plant and not the fiber, and I wanted that. That is one thing that would be nice if we could do it.

Another thing that we can do right now is to keep a record of how long the rags have been in the drainer and I have nothing definite on it but I have had indication that rags kept too long in the drainer will have microscopic life, either animal or botanic,—mostly botanic—start on them and that has an effect on the strength of the fiber. I have put that on my slate for my next spare time to work on if I can. That is something to be considered also.

JESSIE E. MINOR: It would seem to me that would be more than a microscopic matter. I see no reason why a mill should not be able to protect its drainers against growth. I am quite sure that in the mills in which I have worked they were able to do that thing. It is purely a matter of control. Where that has happened in the mill it may happen to any other sort of fiber too.

B. JOHNSON (Hammermill Paper Company, Erie, Pa.): There is so much meat to this paper that it is very difficult to pick out something special for a discussion. I think the results are very interesting especially as far as the chemical changes, due to heating go.

However, I would not go as far—at least not at the present time—as the author of this paper has by tying up the permanence of paper with the heating tests at 100 degrees for 72 hours. I think that is a very unnatural condition to put the fiber into. We know, for instance, with the pulp that it has a certain amount of pentosan and if that is put into an unnatural condition the fiber will dry up and it takes a very long time before you can recondition that fiber to such an extent that you are justified in testing the fiber and comparing it with some previous results.

I think in time possibly the fiber may come back to the same, or almost to its original condition. It is only natural that if we dry the fiber out completely and get this folding substance that the folding endurance test will be reduced very much. I think that a few degrees difference in the heating treatment, or as was suggested by one of the speakers, different condition of the moisture of the air, might give results that are more to the point as far as permanence is concerned.

I do not think we can draw conclusions. It is very dangerous to draw any striking conclusions before this work has been completed, before we have made certain tests that have been suggested now, and I think they were also suggested in the paper. I think in continuing this work it should not be the policy to take the best method at hand at that moment but to try to improve the methods so that we do not have to contend with this point in later discussions.

CHAIRMAN BAKER: Dr. Johnson has brought up a phase that seems of considerable interest.

EMIL HEUSNER: I think there is one point which is being overlooked in the whole discussion, and that is, I understand what the idea of this paper was, it was to compare results and not to find out the tests which might be all right in all cases and why should such tests be applied.

Here are raw materials, sulphite pulp and soda pulp and purified pulp and rags. These four or five raw materials are being compared and the tests applied appear to give a very good test as to the durability of raw materials. Everything depends on the comparison here. Therefore, I see no objection to applying this heating test I am referring to. It is only to shorten what nature does during many years. It is the same as if you synthesize coal for instance from cellulose by heating it under high pressure with water. It shortens the time which nature needs for doing this thing.

We cannot wait until we are able to compare papers which have endured for forty or fifty years. We have to have a test which allows us to predict what will happen later on. Therefore, I see no objection to this rough or drastic treatment. You

really find here that some of the raw materials stand up much better than others.

I think the right conclusion has been drawn from that. We all have to try to purify our raw materials for those papers which we expect will have a long duration.

I want to say something about sizing. Why make it so complicated. Cut out this sizing business. It has nothing to do with the question at all. We all know that sizing improves the durability of paper, therefore we should not make it so complicated. We should only consider the raw materials and compare them and then pick out the best raw materials that we can find, then if you size it, if necessary, you will get a still better result.

That is how I look at the question.

ALLEN ABRAMS (Marathon Paper Mills Company, Rothschild, Wis.): I think one of the things we have to be very careful about in any test for paper is to get a test which will indicate the actual usage results. I think a very valuable piece of work has been started here on attempting to get an accelerated test. I am afraid that the answer is going to come when a lot of us are more gray-headed than we are at this time.

I presume Mr. Scribner and his staff are arranging to take these same papers and put them under equal conditions of humidity and light and so forth and at periodic occasions take them out and test them and then see whether they can correlate the results with that.

Frankly, I do not really see how we can predict on this until we know more about it from that standpoint. I for one would not be in favor of drawing any premises until there is more certain evidence that we can parallel the usage test with this one.

I would further suggest that in drawing up the conclusions here, since it has been pointed out that the tests are not known to give reproducible results in practice the statement in the conclusion which says "the data obtained thus far" should read "obtained thus far by methods which are not yet known to be reproducible in actual usage." I think we have to approach this subject with a good deal of caution.

J. P. PRESCOTT: I have gathered from what has been said here, and I would like to ask Mr. Scribner for his opinion on this, that until a method can be devised whereby we can more nearly duplicate the action of time the tests for permanency which he has made are applicable only to unsized papers?

B. W. SCRIBNER: That question is a rather hard one to answer. I would not say Yes as a definite proposition. All the work we have done with sized paper indicates that glue sizing is not as permanent as the fiber. One instance of that is currency paper. We find that the currency paper through the printing process in the Bureau of Engraving, for instance, has some strength imparted to it by glue sizing but that is practically all lost in the following process. That is strictly a service condition. Of course, that is rather a rigid condition. The paper is washed twice and heated twice and then pounded and so on. That is simply an accelerated aging test, you might say.

I really think you will have to take your materials as you have them and while sizing does put a complication in and the aging effect no doubt does depend somewhat on the character of the sizing and so forth, yet you have those actual conditions existing. You have the different kinds of sizing and as I say all you can do is to work with what you have.

In regard to the natural aging of these papers, we are keeping them very carefully to follow up the natural age. In regard to this heat treatment, it has quite a lot of authority behind it, although it has never actually been compared with natural age. It is a treatment that is applied to practically the most of the organic materials when a test for deterioration is made. It is used for testing rubber for instance, textiles to some extent too. Theoretically it seems to be a good test because heat naturally accelerates any chemical reaction. What we are studying, and what takes place is chemical deterioration.

CHAIRMAN BAKER: I would like to ask a question. While it is true, of course, that heat is used in this case to accelerate the chemical reaction, has anything been done at the Bureau of Standards to indicate that there are no additional reactions set up there in the different types of paper at the elevated temperatures which do not occur at the normal temperatures of use?

B. W. SCRIBNER: That is hard to answer at the present time. Of course, we made these chemical tests of the paper, the alpha cellulose, the resins and the content of pentosan before and after the heat test and it seems to me that they would react as you would expect them to react under natural age. Where you have your alpha cellulose associated with an impure form of cellulose you get a lowering of your initial alpha cellulose content. The same thing is true if you have an impure fiber; your copper number increases and so on. It would seem to me, as far as we have gone, the reactions that we have found due to the heat test are what you would expect in natural aging.

GEO. F. RICHTER (Director of Research, The Brown Company, Berlin, N. Hamp.): I think the impression left by this paper depends a whole lot on what you are trying to prove. I have been listening to the comments very carefully and have been wondering just what is in the minds of most of the people present.

Apparently, there is a dissatisfaction regarding the present subject to our heat test and I would conclude from the dissatisfaction that most of the men present are not convinced at all that sulphite pulp will stand up just as well as rag pulp.

I think most of us here have been in the paper business long enough to know that that is not so. I do not believe there is anyone here who will argue that a sulphite pulp, a bleached sulphite pulp, will stand up as well as a high grade rag fiber. Some of us think and believe that the bleached sulphite pulp will stand up better than a poorly prepared rag fiber.

With the results as presented under this super drastic condition of heating there appears to be evidence that some of these purified wood fibers stand up under this super drastic treatment as well as does a high grade rag and under those same super drastic conditions the bleached sulphite pulp does not stand up as well as rag. Therefore, it seems to me that Dr. Heuser's opinion regarding the value of these relative tests is right to the point.

If we had found by these drastic pests that both the purified fiber and the ordinary sulphite fiber had fallen down when subjected to this test you would naturally have drawn the conclusion that the purified wood fiber was not better than an ordinary sulphite pulp.

If, on the other hand, the purified fiber does, when subjected to this acknowledged, very drastic test, stand up as well as a high grade rag, why not assume that so far as you know it will also stand up in aging as well as the high grade rag?

It is already granted that the bleached sulphite pulp is inferior in regard to durability to the high grade rag, and if this test indicates and demonstrates the same thing, why stop short of your conclusion at that point even though we all acknowledge that this test is a tentative test but presumably the best test we have because no other better test has been suggested here this afternoon?

W. D. HARPER (New York City): I would like to ask Mr. Scribner what importance he attaches to the condition of acidity and copper number in the handling of the pulp? The rules would be thoroughly applicable to the pulp, but when you have your samples in the form of paper, how much, in your judgment is attributable in the difference in the tests to the beading and the cooking of the rags, or the cooking of the fiber, or whatever it is?

B. W. SCRIBNER: We really haven't gone into that far enough to analyze the effect of these impurities. On the heating test, we have had to take the papers as a whole and put them through

these tests and find out what they do. We are at the point now where we would go back and study what effect can be attributed to each of the impurities present. We mean to do that by studies in our own paper mill where we will know the history of the paper. We will know what is in the paper and how much there is of it. Of course, we can analyze the commercial papers and find out what is doing that because without knowing the whole history of the paper the results will not be of much value to us.

CHAIRMAN BAKER: I have another question in connection with this that might have some bearing on that. In this one portion of the paper, in discussing acidity the statement is made, "therefore, in any study of permanence acidity is a factor of extreme importance." But in the tabulation of the results of the tests there is no parallel column of acidity. I wonder if there is any parallel data?

ROYAL H. RASCH: We haven't gotten to that as yet. We are planning to include it in on these papers in later work we will do.

CHAIRMAN BAKER: We were discussing the different sized papers. It seems to me to be clearly evident that the question of acidity might be shown to explain a large part of the difference in the results obtained with the papers sized by various manners and by various mills from the several sources from which you have collected the samples.

A. C. WALKER: In that particular connection and in answer to that particular question, I have some evidence that we have obtained to date though it may not be directly applicable to sized papers. I can state this that in the manufacture and use of certain types of unsized papers with which I am familiar we have made tests similar to these, fairly comprehensive, at 70 degrees C. for three months, 90 degrees for about 10 days and 135 degrees for 48 hours. The tests were entirely similar to these. We made folding endurance measurements, tensile strength and other measurements, also acidity.

Our papers must be below 2/100 of a per cent acid in order to pass certain specifications which we want, or at least it is considered desirable to have them below that. If the acidity is above that the papers go very quickly in these different baking tests. Whether you choose 135 degrees for 48 hours, or 100 degrees for 72 hours, or 90 degrees for 10 days or 70 degrees for three months, or whatnot, isn't as important as it is to control all these variables. I will say that all of the variables in our case are practically under control We have tried to control oxygen, that is, all of our tests were baked under conditions of this sort: The samples were sealed up in tubes, the tubes were in one case and they were completely evacuated to insure the absence of oxygen, and in that case those that were going for three months were almost destroyed.

We also baked some samples in an atmosphere of limited moisture content. We also baked them in an atmosphere of room temperature and we reduced the pressure. We did three tests, part of them were at reduced pressure and the other part was at atmospheric pressure. Without going into detail it can be said that the tests gave results which would be expected on the basis that oxidation is probably the largest factor controlling the deterioration of paper in general.

By raising the temperature you do get acceleration and an accelerated test under high pressures or temperatures should be useful to you paper manufacturers and users because it helps to get at the picture quickly, that is all.

One of the difficulties that I found with the test which we made was that samples were all tightly bundled up and put into tubes. It would have been better to have had the samples spread out so that they would all be at the same temperature and exposed to the same conditions. We are attempting to do that in some tests and we are going to do it on the basis expressed in this paper for the A. S. T. M. Committee in connection with paper, however, not like that which you are interested in.

In our work we are attempting to control the humidity conditions which paper is exposed to. That might account definitely for the difference in the results that Dr. Bentzen got as compared with the results expressed in this paper. If the papers were baked in an oven exposed to atmospheric condition, then in the summer time where the moisture content of the air in the oven is high although the relative humidity is low you might get quite different results than you would get in conditions where the weather is dry in the winter and the actual moisture content of the oven is very low.

Moisture may not be the whole story but it is interesting to note the results that were gotten with the samples baked in an oven at 95 degrees by having the beaker of water in there. That doesn't, however, tell the whole story. He has a discrepancy there in the temperature of five degrees and that makes a considerable difference. I could prove that by the other comparisons that here were mentioned.

I do not believe it is worth while to say too much in the way of criticism other than to state that the various factors involved should be as carefully controlled as it is possible to control them.

Suppose somebody else in another paper mill attempts to reproduce your results, or attempts to use the same sort of apparatus for getting the results on papers that you got, they are interested in that, but unless you set up a simple, reproducible condition the results at one laboratory will be different from the results obtained at another one. There might be considerable discussion immediately on the conclusions that should be drawn.

We have had a very good instance of that in the case of acidity determinations. Until we got down to some factors that were involved in making an acidity determination we couldn't get the laboratories to agree. We got the conditions as near constant as possible and then the laboratories agreed within .005 of a per cent. I think it is extremely important that in any tests of this sort various conditions should be taken into consideration.

B. W. SCRIBNER: In this case the differences are so great that I think the actual humidity of the oven had very little effect.

For instance, we ran the same test in a steam chest where the paper was subjected to steam saturated atmosphere of 95 degrees and the general results were practically the same. Of course, if you are concerned with very small differences then the humidity of the oven might be important.

A. C. WALKER: It would make a difference would it not in the case you were trying to check with some other laboratory on a given sample of paper?

B. W. SCRIBNER: That is what I say, if you are concerned with that it would. However, where there is just a little difference it isn't so bad.

HELEN U. KIELY: We have been trying to check similar results in our laboratory and my conclusions are different from many that Mr. Rasch has gotten. I have been using presumably the same type of oven and the methods he uses, but I am not able to get the same results. I think that probably the methods have something to do with that.

I think if two laboratories are working independently, unless they have more standard methods they wouldn't agree in their conclusions. That has already been brought out.

JOHN L. PARSONS: In regard to the copper number determination what precision are you capable of getting?

ROYAL H. RASCH: About five to eight per cent. That is as close as any that we have gotten.

HELEN U. KEILY: You mean you check within five to eight per cent?

ROYAL H. RASCH: Yes. That isn't, however, very close.

HELEN U. KEILY: Some of your figures for copper number taken before and after aging show an increase which is within experimental error, yet you figure 27 per cent increase, 16 per cents increase, and so on. Is that right?

ROYAL H. RASCH: That is what I pointed out.

BIRCHARD: There also seems to be a question of dehydration that hasn't been taken into consideration. On all samples of paper aged, 15 in number, we found the moisture content of these papers was much lower under the same conditions after aging than before aging. I think that is an extremely important matter. That hasn't been taken into consideration.

CHAIRMAN BAKER: I believe the point was hinted at in what Dr. Johnson said. I wonder if there is any more exact information on that.

BIRCHARD: I have the actual figures here if they are of any interest. On one alpha paper in particular the moisture content before aging was 3.3 per cent. After aging it was 2.9 per cent. Another high grade paper dropped from 3.5 to 3.2 per cent. There was a much lower moisture content in the alpha than the high grade paper.

A. C. WALKER: What was your precision in making those moisture content measurements? How close did you check yourself? Also, how long did you condition them?

BIRCHARD: For 24 to 48 hours.

A. C. WALKER: Was that in a moving stream of air?

BIRCHARD: Under stationary air.

A. C. WALKER: That may make a considerable lot of difference. It has made a difference in some experiments that I have tried to run to determine the moisture content of cotton after it has been heated in an oven at 110 degrees over night. As far as I could tell with an extremely accurate method, probably more accurate than the ordinary methods used in paper laboratories, there was little difference. It was in the hundredths of a per cent.

I am very much interested in your results. They would indicate cate the possibility that if you raise the temperature considerably above 110 you may get a material decrease in moisture. There is a question in my mind as to the precision involved because of some work that I have done on that score.

D. E. CABLE (Oxford Paper Co., New York): What was the humidity of air previous to the moisture elimination? You spoke of moisture determination of around 3½ and some of it less. What was the humidity of the air at which that 3½ per cent moisture was present? Was the relative humidity raised from low values to the 55 per cent, or was it higher before and was then lessened? That seems to have quite an effect.

BIRCHARD: When these moisture determinations were made the actual moisture conditions under which the determinations were made was noted. That was 55 per cent in each of the tests.

INTERNATIONAL'S NEW DALHOUSIE MILL

New Brunswick International Paper Company last year commenced construction on a news print paper mill at Dalhousie, at the mouth of the Restigouche River, in the northern part of the Province of New Brunswick. The plant is being designed for a daily capacity of 450 tons and will have an initial installation of two machines of a combined daily capacity of 225 tons of news print paper.

There will be complete ground wood and sulphite departments at the mill so that wood will be carried through all the various manufacturing processes, leaving as news print paper. As the mill will be located on tide-water, ocean-going vessels can go directly to the mill docks and raw materials can be sent in and paper shipped out about eight months of the year by water

Power to operate the mill will be supplied from the Grand Falls hydro-electric development of Saint John River Power Company, another subsidiary of International Paper Company, a high tension transmission line about 125 miles long connecting the power house with the mill. As a reserve from which to draw the pulpwood required by the mill, the company has assembled 2,362 miles of timberlands, an area slightly in excess of that of Prince Edward Island or approximately twice the area of the State of Rhode Island.

YALE FORESTRY SCHOOL RECEIVES $200,000

Yale University has announced the establishment of a foundation for the advancement of applied forestry. This is made possible by a gift of over $200,000 from Charles Lathrop Pack, president of the American Tree Association, of Washington, D. C. The purpose of the endowment, according to Henry S. Graves, dean of the Yale School of Forestry, is to advance the knowledge and practice of forestry in the United States through field investigations and experiments and through developing examples of applied forestry.

The first work under the foundation will be a study of forestry as now practiced in the United States. The aim of the study is to determine how an educational institution like Yale may contribute to the progress of forestry, through experimental and demonstration forests and in other ways. The study will be conducted by Dean Graves.

"Yale owns or controls a number of forest tracts in Connecticut and New Hampshire, which are used for instruction and research, and for the demonstration of forestry practice," said Dean Graves. "The Charles Lathrop Pack Forestry Foundation will greatly enhance the service that can be rendered by Yale through these facilities.

"Mr. Pack's economic foresight and practical knowledge of forestry has followed the lines of developing demonstration forests, and emphasizing their service in the determination and illustration of practical methods of forestry. He has furnished resources for the establishment of the demonstration forests of the New York State College of Forestry of Syracuse University, and of the College of Forestry of the University of Washington; and he has given to Yale University funds for the enlargement of its forest tract at Keene, N. H. Recognizing the need for getting at essential facts he established at Cornell University a chair of Soil Science, designed especially for work in forest soils. He has created the Charles Lathrop Pack Forestry Trust, a foundation through which aid has been extended to a number of schools and other agencies engaged in forestry work. As part of his educational work he has given 3,000,000 Forestry Primers to the schools of the nation.

"Mr. Pack's gift is of importance not only in strengthening the work of the Yale School of Forestry, but also in extending the knowledge and practice of forestry. One of the greatest needs today is to bridge over the gap between theory and practice, and to show how the principles of forestry may be better applied in the forest, in light of our prevailing economic conditions. The experimental and demonstration forests of the School are well adapted for the work contemplated under the foundation. These forests are centers of forest activities where the student, the scientist, the landowner, and layman may see displayed the methods and results of forestry practice. They are the laboratories for field investigations and experiment, for practical instruction, and for the trial of different methods of forestry. Here one may see what forestry practice really is, what it costs, and what it accomplishes. Yale's contribution to forestry, through the results of its experiments, through the development of methods of silviculture and management, and through its public educational work, will be greatly increased by Mr. Pack's foresighted gift."

START WORK ON WILLAPA MILL

The Willapa Pulp and Paper Company has let two preliminary contracts for the start of its new plant at South Bend, Wash., and work will go forward at once. Butz Brothers of Menlo received the contract for furnishing the piling and have started logging operations in the vicinity. The Willapa Construction Company received the contract for pile driving. Requirements will be 1,500 piling to support two buildings, one 600 feet long and one 450 feet. It is expected that this work will take seven weeks. A. E. Barry, secretary of the Willapa Pulp and Paper Company, and L. A. De Guerre, consulting engineer, with his assistants, are on the ground.

Committee Reports at A.P.&P.A. Convention

Tariff Committee

On February 20, 1928, the Association's General Tariff Committee held its first meeting and adopted recommendations to the effect that affiliated associations be requested to appoint tariff committees in such a way as to secure complete territorial representation of the industry and that these sub-committees submit their briefs to the Association's General Tariff Committee in order that the needs of the various branches of the industry might be harmonized by the Committee for presentation before the Congressional committees.

Request for appointment of sub-committees was sent to the secretaries of affiliated associations and to unorganized groups in the industry on March 8, 1928. Repeatedly during the year the Association stressed to its members and secretaries of affiliated organizations the necessity of preparing their briefs for hearings before the Congressional committees.

Early in the winter announcement was made by Hon. W. C. Hawley, Chairman of the Ways and Means Committee of the House, that his committee would hold hearings from January 7 to February 25 and your Secretary, therefore wrote to Chairman Hawley requesting that the Association be given at least a day and a half in which to present the industry's tariff needs on the paper schedule hearings, February 13th and 14th.

A preliminary tariff conference was called by the Association at the Union League Club in New York on December 18 to which the Committee presented the following recommendations:

1. That no effort be made by the Association's General Tariff Committee to secure a duty on pulp or news print.
2. That the Association's General Tariff Committee retain Wise, Whitney and Parker to supervise the paper industry's tariff revision activities.
3. That the information collected during the past four years by the Import Committee be made available to the Association's General Tariff Committee in the preparation of the brief which will be presented to the House and Senate Committees by the Association's General Tariff Committee or its Counsel.
4. That the Tariff Committee solicit funds for the industry's tariff revision activities through the key men in each of the groups involved.

These recommendations were approved by the conference and given general publicity throughout the industry. Arrangements were then made with Wise, Whitney and Parker to supervise the industry's tariff revision activities with the co-operation of the Import Committee of the paper industry. The chairman of each of the groups involved was requested to obtain funds for his group's participation in the Association's tariff revision activities for the industry.

Every effort has been made to keep the industry fully informed, both by correspondence and printed matter, of the tariff revision needs and the necessity for adequately financing this tremendously important work.

A brief, presenting the tariff needs of the industry as developed by the experience of the Import Committee during the past four years and also as made known to the Association's General Tariff Committee by various branches of the industry, was prepared by Wise, Whitney and Parker and presented to the Ways and Means Committee of the House by the president of the Association in behalf of the entire paper industry, the testimony of which was substantiated by witnesses from various branches of the industry. It is expected that this will be followed closely by our Counsel and the necessary presentation made to the Senate and Conference Committees in order that the industry may be assured of that measure of protection to which it is entitled and which is necessary for its continued successful operation.

Your committee emphasizes the fact that its tariff revision work is not an activity of the Import Committee or of the American Paper and Pulp Association alone but is an emergency which must be met by the entire paper industry and it, therefore, has felt at liberty to incur whatever expense has seemed necessary to adequately present the industry's tariff needs in order to insure reasonable protection during the coming years. The committee stresses the necessity for promptly and adequately financing its activities as funds are not available for this work in the treasuries of either the Import Committee or the American Paper and Pulp Association.

MILTON E. MARCUSE, CHAIRMAN

Committee on Simplification and Standardization

Standardization and simplification of commodities can be and should be applied to commodities ready for use by the ultimate consumer. Paper as supplied by the manufacturer must first be converted—either by a converter into an article ready for final use or by a printer. In most cases the paper manufacturer is, therefore, supplying a raw material which needs further manufacture before it is ready for ultimate consumption; he has no way of knowing into what article his product will eventually go or to what use it will be put.

Under these conditions, the Committee on Simplification and Standardization feels that efforts toward standardization and simplification in the paper industry should be undertaken, in conjunction with the Division of Simplified Practice of the Department of Commerce, by the various associations who contact with the converter, printer or the final consumer. It is impossible for the manufacturers as such to bring about the desired results.

Your committee recommends, therefore, that the Secretary of the American Paper and Pulp Association be instructed to suggest to the different affiliated associations the formation of committees and the initiation of steps to co-operate with the proper government agencies in order that conferences may be called with consumers to discuss the measures looking toward standardization and simplification as it applies to the individual groups of paper grades.

S. L. WILSON, CHAIRMAN

Advisory Committee to the Department of Agriculture

This committee has been in contact with Secretary Jardine with the view to working out definite arrangements whereby the industry could be kept more intimately informed of the activities of the various branches of his Department as affecting the paper industry and also whereby the industry could make its needs known to the Department.

Your chairman recommends that the present committee be discharged but that a new committee be appointed to carry on this work as may appear necessary in the future.

GEORGE W. SISSON, JR., CHAIRMAN.

Committee on Statistics

During the past year, the Association's Statistical Department, with the co-operation of the Committee on Statistics, has amplified and revised the statistical program of 1927.

The Association has also extended its statistical service to the industry. Its monthly statistical summary of production, stocks and shipments has been amplified and is being presented to the industry in a clear and useful form. Charts are used extensively. In this connection, the *Weekly Business Review* has been enlarged to include separate sections devoted to paper, pulp and raw materials, as well as timely information on the current business situation.

The statistical staff of the Association has made rapid progress in developing statistical services for various group associations. At present, current statistics are gathered and compiled for the wallpaper manufacturers, soda pulp manufacturers, cardboard manufacturers, and a large group of boxboard manufacturers. Arrangements have been made for a special statistical service for the National Sulphite Paper Manufacturers Association and the National Kraft Paper Manufacturers Association.

Your committee on Statistics, working largely through the Statistical Department of the American Paper and Pulp Association, has also co-operated closely with the Bureau of the Census. As a result, an abbreviated census of the paper industry, for the years intervening between the Biennial Census, has been authorized by the Bureau. A bill has been prepared for presentation in Congress, to authorize legally the abbreviated census on the even years. The paper industry will be prominently included in the Census of Distribution, 1929, and the Statistical Department of the American Paper and Pulp Association will co-operate fully with the Bureau of the Census in this survey.

As a result of the revision of the biennial census forms in 1927, many mills had difficulty in reporting their production statistics promptly. It is evident that another revision is necessary. Your committee recommends a general simplification of these forms as soon as the results of the 1927 census are fully known.

Your committee further recommends a combination of census forms for pulp and paper, because of the difficulty experienced by self-contained mills in accurately separating certain data between the pulp and paper sections of their mills. It is also recommended that the census forms used by paper converters be revised to show production in terms of value. Experience shows that most converters are unable to report tonnage of production as called for on the 1927 forms.

Your committee urges the further extension of the statistical service which the Association is rendering the industry. This service is proving its worth consistently, and under its present direction it is constantly being amplified to meet more adequately the requirements of the industry.

Your committee especially urges the active co-operation of the industry with the Statistical Department of the American Paper and Pulp Association. Dependable statistics are vital to the success of the industry. The Association has the necessary facilities to render prompt weekly, monthly, and annual statistical reports. The extent to which it can meet its obligation to the industry depends upon the promptness and completeness with which the industry reports its figures to the Association.

C. B. MORGAN, CHAIRMAN.

Advisory Committee to the Bureau of Standards

The Association's Advisory Committee to the U. S. Bureau of Standards has not been active during the past year, but has approved the recommendations of Mr. Geo. K. Burgess, Director of the Bureau, that the Association appoint a man to act as an active contact medium between the Advisory Committee and the Bureau. The duties of such a man would be to maintain close personal touch with the activities of the Bureau, to keep the committee fully informed at all times and to acquaint the committee with the problems of the Bureau.

Mr. Burgess also suggests the maintenance of an agent in Washington to contact with government activities that may affect the paper industry in either a business or technical way. Among other things, such an agent would represent the industry in a general advisory capacity; keep the Association fully informed on important developments in Washington; and act as a service man for the individual members of the Association. The Bureau of Standards would be glad to provide facilities for a representative of this kind and to assist him in making and maintaining the desired contacts throughout the government service.

ERNST MAHLER, CHAIRMAN.

JOINT COMMITTEE ON VOCATIONAL EDUCATION OF THE PULP AND PAPER INDUSTRY

Educating and training workers is not solely a philanthropic proposition; it is an economic one which every successful industry must solve sooner or later. Many of the most efficient industrial organizations today, recognizing the handicaps imposed by a lack of sufficient, thoroughly trained workers, capable of responsibilities, have undertaken vocational educational programs.

The objective of an educational program on the part of both workers and management should be the production of a greater quantity of a product of a better quality at a lower cost. In this the workers have a large responsibility which they have seldom recognized, despite the possibilities of increased earning capacity. The responsibility of the mill executives is equally obvious.

Under the Smith-Hughes Act (Vocational Educational Law) many industries are conducting educational work in co-operation with the government. In the paper industry the most extensive development of this kind is that which is being conducted in Wisconsin by Mr. Harold G. Noyes. All vocational educational work in co-operation with the government is under the supervision of a Federal Board of Vocational Education.

Your committee has taken up with the Federal Board of Vocational Education the possibilities of training workers in the paper industry. Mr. Frank Cushman, Chief of Industrial Education, has indicated that the Board is interested in conducting co-operative programs in all legitimate fields, including foremanship, but it must be assured of sufficient evidence of interest on the parts of executives and superintendents.

The Joint Educational Committee of the Pulp and Paper Industry, composed of two members each from the American Paper and Pulp Association, Technical Association, and the Superintendents Association, was organized during the past year to study, coordinate, and develop the educational work of the industry. The committee has made a survey of the educational activities that are being conducted in the industry at the present time. Two questionnaires sent to the industry at large, revealed the fact that 45 mills are carrying on some type of educational activity. Of this number, 67 per cent indicated that the educational work was of direct value to the mills, 23 per cent had just undertaken educational programs and 10 per cent had found the educational activity of no particular benefit. Practically 94 per cent of the educational work in the industry is in co-operation with the public schools.

Nine mills reported foremanship classes, seven of which were conducted on company time. In six mills attendance is voluntary, but in three it is compulsory. In four mills the work is conducted by educational authorities, three by outside agencies, and two mills conducted their own activities.

Thirty-eight mills reported the employment of students during the summer and, from fourteen mills in this group which gave detailed information, we find that 160 high school students were employed, 60 per cent of which are expected to become eventually paper mill employees.

Ninety-three per cent of these mills considered this work had been of value.

Seventeen mills reported the employment of eighty college students through the summer, 42 per cent of which were expected to become permanent employees. Twelve mills reported direct value of this work.

The tendency in the pulp and paper industry has been to develop merely the manipulative skill of the workers. With few exceptions no consistent effort has been made to develop their brain power and ability. It is evident that in cases where every man in the plant has a more adequate knowledge of his particular work, a clearer conception of his company's policies and a more thorough knowledge of the product produced, there is found contented labor, intensely interested in its work, with a small turn-over and with a

minimum of waste through carelessness. Education, moreover, does much to eliminate among workers the inherent suspicion of modern applied efficiency methods.

Incidentally, educational activities should not be confined entirely to workers. There is considerable need of training among the executives to help them to understand more thoroughly their jobs from an administrative, psychological, and sociological point of view. The executives are the tribal leaders of today and it is vitally important that they understand thoroughly the human problems involved in the organization for which they work.

The Committee has received from the T. A. P. P. I. Committee on "Training for the Industry," from Mr. H. G. Noyes, Coordinator of Pulp and Paper Industry in Wisconsin, and from the Central Committee on Education of the Canadian Pulp and Paper Association, comprehensive reports of their work, as well as reports from all the educational institutions in this country and Canada who are training men for the paper industry. We request permission to have these reports printed in a pamphlet for distribution to the members of our various organizations.

With this general information as a basis, your committee has, during the past year, studied the possibilitiess of educational training in the industry to determine, in order, the facts regarding the problem objectives of such work, the agencies available to conduct educational activities, and the organization necessary for conducting industry-wide programs.

It is clearly evident that much waste in the industry is due to inefficient help. Experience shows that educational work tends to reduce this waste—the economic significance of which is not generally recognized by mill executives. The conduct of educational programs is handicapped by lack of suitable teaching material, knowledge of teaching procedure, and by the fact that mill management departments are unfamiliar with procedure and have, usually, no one capable of assuming the responsibility. There is, in addition, a lack of definite objectives on the part of the three organizations of the industry which are participating in this work. Only the larger mills are able to employ educational directors and conduct the work with the most profit.

The objectives of educational work include proving definitely its value as a waste prevention measure, in order that the interest of executives may be enlisted in specific programs. The mills must be assisted in undertaking educational work, and every effort should be made to obtain suitable teaching material and to develop adequate teaching methods. The three organizations represented by this committee, should develop a strong co-operative program, co-ordinate the educational work of all agencies in the industry, promote programs in paper making states, interest state educational departments and secure federal aid under the Smith-Hughes Act.

The following agencies are available to assist in educational extension work:

1. Joint Educational Committee of the Pulp and Paper Industry.
2. Joint Text Book Committee.
3. Education Committees of the various organizations.
4. Federal Board of Vocational Education.
5. State Industrial Commissions.
6. National Safety Council.
7. National Industrial Conference Board.
8. U. S. Chamber of Commerce.
9. Schools and colleges:
   University of Maine
   N. Y. State College of Forestry
   University of Wisconsin
   Forest Products Laboratory
   Institute of Industrial Arts
   Three Rivers Technical and Papermaking School
   Massachusetts Institute of Technology.

In order that an effective program can be carried out, a joint educational committee should be formed, adequately financed by the American Paper and Pulp Association, Technical Association of the Pulp and Paper Industry, and American Paper and Pulp Mill Superintendents Association, and given power to employ a Secretary or Educational Director to carry on an extensive program.

J. NORMAN SPAWN, CHAIRMAN.

Advisory Committee to the Department of Commerce

The purpose of the Advisory Committee to the Department of Commerce is well described in Mr. Hoover's letter of January 11, 1922, as follows:

"In endeavoring to make the Department of Commerce of greater usefulness to American business, I have seen the advisability of working closely with the trade associations through committees of their members. Among others, I have been in touch with the American Paper and Pulp Association, and, as a result of its appeal, we are organizing in the Bureau of Foreign and Domestic Commerce a small division to give especial attention to the export problems of the paper industry. Mr. Grosvenor M. Jones, who will be in charge of this work, will render maximum service only if he has the full co-operation and assistance of the leaders in the industry, and the most effective way of securing such co-operation is by the formation of an advisory committee."

Your committee strongly recommends that the Secretary of the Association maintain frequent contact with the Department of Commerce, not only in New York City but particularly at Washington. The most that can be accomplished by a standing committee is to meet occasionally with the Secretary of the Department of Commerce and with his principal assistants. It is difficult to obtain benefits from such meetings beyond the establishment of cordial relations. However, the Secretary of the Association, by regular and as frequent contact with the Department of Commerce as practicable, can maintain the cordial relations of the past, and bring to the Association all of the advantages which such regular contact makes possible.

The committee recommends that it be discharged and that a new committee be appointed, by the new administration, when and if it seems advisable to do so.

NORMAN W. WILSON, CHAIRMAN.

Committee on Waste Utilization and Stream Improvement

The American Paper and Pulp Association, in the appointment of its Committee on Waste Utilization and Stream Improvement, has recognized its responsibilities in the matter of Stream Improvement, and its opportunities in the matter of the economic utilization of pulp and paper wastes. The Association, furthermore, has shown its earnestness in its attempt to meet these responsibilities and opportunities by the employment of an engineer who is devoting his entire time to the study of the situation.

The activities of your committee and of the Association's engineer have done much to stimulate interest and to bring about a marked improvement in fiber utilization in the various mills during the past year. Illustrative of this is the development in the Miami Valley Mills. A year ago little had been accomplished in that section, but data recently secured indicate that at practically every mill definite improvements have been made or are in progress, or that plans have been approved for them. The pulp and paper industry may now be said to be engaged in an active, aggressive movement to recover and utilize all fiber loses.

A full report of the accomplishments of the year in this and other phases of waste utilization and stream improvement has been published elsewhere by the Association in a paper, "Progress in Waste Utilization and Stream Improvement, 1928." The Committee directs attention especially to the following phases of the situation as presented in that report.

INDUSTRIAL AND MUNICIPAL RELATIONS

No industry can live to itself alone. The water of a stream must be used and reused by one industry or municipality after

another. The rights of the one to discharge waste is involved in the rights of the other to a water supply that can be economically purified to a degree consistent with his needs. In recognition of that relationship, committees composed of representatives of the various manufacturers are in active operation in some of the states and are becoming effective in eliminating their own mutual difficulties.

Relations Between Industry and the States

The organization of state committees, together with the development of constructive co-operative programs between them and state officials, has constituted the principal work during the past year.

The States through their legislatures and through their public officials enact and execute those laws which determine the status of industry and municipalities with regard to the disposal of waste into public waters. It is recognized that a growing industrial civilization is vital to the prosperous development of the country and that under such circumstances regulatory measures are necessary and desirable. That the pulp and paper industry and the states are proceeding along regulatory rather than prohibitory lines in an attempt to reach a solution of stream improvement problems is evidenced by the sympathetic and understanding co-operation which is now possible through the activities in several states of committees composed of state sanitary engineers and other state officials and of representatives of the pulp and paper industry. The co-operative approach to these problems which was so successfully demonstrated in the state of Pennsylvania, not only with the pulp and paper industry, but with other industries, has been found effective in other states and is leading to a constructive solution of a very complex and difficult set of problems.

Your Committee on Waste Utilization and Stream Improvement is proceeding along similar lines and includes five state sanitary engineers among its members. It is believed that the development of such co-operative programs will, among other things forestall radical legislation and policies. It is believed also that the co-operative programs should be developed prior to the adoption of legislation and policies for the reason that, once they have been adopted, it is very difficult to change them, however unsatisfactory they may be.

In the continuation of activities already initiated, attention must be given to more complete co-ordination and extension of the activities of the co-operative state and specialized group committees. This is essential if duplication of effort is to be prevented, and the maximum of results secured for expenditures made. Closely associated with this there must be a continuation and extension of the co-operative policies initiated with the state boards of health, sportsmen's organizations, and other similar groups. These activities constitute foundation work necessary to the welfare of the industry.

Research

There are many technical phases of the problems of stream improvement which can be solved only by a continuous program of intensive research. In the first place there must be determined the actual effects upon the public waters produced by the discharge of the several types of waste. Then, recognizing that the existence of industry is not compatible with the maintenance of the public waters in their completely virgin state of purity, there must be established permissible degrees of cleanliness of the public waters. These standards of cleanliness will necessarily vary from place to place depending upon the interrelated interests of industrial, social and recreational life, and may vary from time to time due to the changes which may occur in the interrelated interests. The public health is, of course, in all cases of paramount importance. Finally, there must be developed technical improvements and process modifications which will bring the industrial processes into accord with the standards of stream cleanliness consistent with the local conditions.

In the solution of these technical problems many research agencies must be brought into harmonious co-operation. State agencies are concerning themselves with the determination of standards of stream cleanliness and of the degree to which existing conditions are in conflict with those standards. In their investigations, co-operation with the technical staffs of the individual mills is being aided through the medium of the several state committees. Guided by the results of these co-operative efforts the mills can the more intelligently prosecute the scientific research essential and prerequisite to a correction of such evils as may be found to exist.

Not only are individual mills vigorously attacking the problem, but co-operative committees, to study the various specialized problems, have been organized in the strawboard, paperboard and sulphite branches of the industry. Definite progress is being made by these committees.

Equipment manufacturers are playing an important part by their development of the improved machinery necessary to the corrective measures. The Forest Products Laboratory and the Bureau of Standards are contributing new and modified pulping and papermaking processes and a more intimate knowledge of the fundamental principles underlying the standard processes.

The most difficult and serious problem confronting the committee is on sulphite wastes. In practically every state where there are sulphite mills, serious complaints have been made regarding the deleterious effect of the wastes on the stream into which they are discharged. Certain individual mills are seriously embarrassed because of these conditions. There is some promise of economically feasible utilization of these wastes, but satisfactory methods have not yet been developed. The support of sulphite mills in developing a unified and sustained program for the study and solution of this problem is essential.

The Sub-Committee on Sulphite Waste, under the chairmanship of Mr. George K. Spence, working through the Committee on Waste Utilization and Stream Improvement, is endeavoring to co-ordinate the research on sulphite waste liquors and is at the present time compiling data on installations which have been made in the past for the disposal of that liquor, pointing out the successful and the unsuccessful and giving as nearly as can be obtained the reasons for success or failure. It is studying the present status of the market and possible future market for this liquor, should the coal briquetting industry expand. It is also studying the possibilities of economically evaporating and burning the liquor from a fuel standpoint.

The sub-committee plan is applicable, as the situation develops, to other types of waste.

Technical Service for Individual Mills

At the request of the executives, your engineer, Mr. Baker, has made preliminary surveys of a number of mills, and has submitted reports thereon outlining for each mill a program of studies and of improvements in waste utilization. There have been received also a number of requests for the development of more detailed technical assistance, such as supplying experts to make studies of specific problems. There is a growing demand for service of that kind and the committee will, during the coming year, consider with the engineer, the advisability of organizing a service that could be made available to the industry at a reasonable cost to the mills benefiting by it. In organization of such a service, due consideration should be given to the co-operation that can be developed with the Forest Products Laboratory and other effective agencies already functioning.

Dissemination and Application of Results

It is to be expected that much of the research directed by individual industrial organizations toward the solution of problems of waste utilization and stream improvement will lead to results having essentially a local importance or involving the development of processes of competitive value. On the other hand, much of the research will lead to results which can properly be disseminated throughout the industry and be made of common value to all

interested operators. The committee and especially its most active exponent, Engineer Baker, stand ready to collect such information as it may become available for general release and provide the means for its adequate distribution to the industry.

The collection, critical survey and distribution of such information becomes a most important part in securing widespread and rapid application of such corrective measures as are found from time to time to be practicable and feasible.

To continue successfully and to perfect the activities in waste utilization and stream improvement, there must be the best of co-operation on the part of all mill executives, since only in this way can reliable, satisfactory information be secured. Data are now being collected and it is planned to publish soon a rather detailed report upon white water utilization. Dependence for this publication must, however, be placed largely upon information secured from the individual mills. With the personnel available, it will be impossible to visit all mills where substantial improvements have been made. Voluntary co-operation in furnishing the essential data either through correspondence or otherwise, is therefore necessary if this report and others, are to be of the greatest benefit to the industry as a whole. It is sincerely hoped that all mill executives will be liberal and free in furnishing data and in the general exchange of ideas.

FUNDS

Although the raising of funds is not considered a function of the committee, the success of its activities and of your engineer is dependent upon the availability of such funds. At its meeting in Buffalo, N. Y., on June 15, 1928, minutes of which were distributed quite generally to the industry, the committee recommended a budget of thirteen thousand dollars for the year. Of that amount only eight thousand fie hundred and twenty-nine dollars has been raised, although all mills have been canvassed by letter communication. There should be no difficulty in raising the modest sum requested for activities along these lines provided the American Paper and Pulp Association gives the program of the committee and of the engineer the unqualified endorsement and provided the mill executives give it their careful consideration. Your active support and co-operation, in the solicitation of funds, is therefore urgently requested.

JOHN D. RUE, CHAIRMAN.

Advisory Committee to the Lake States Forest Experiment Station

While your committee has not been especially active during the past year, yet individually its members have followed the work of the Experiment Station closely and feel that should occasion arise whereby either the Station or the Association might need the more active co-operation of the other this could be very readily developed on the basis of the closest personal contacts which have been established.

D. C. EVEREST, CHAIRMAN.

Advisory Committee to the Forest Products Laboratory

The Advisory Committee to the Forest Products Laboratory, after careful consideration of the work of the Forest Products Laboratory and the status of research in the industry as a whole, urges the expenditure of greater effort in technical research and its application to the conditions of the industry.

Economic conditions in the paper industry are constantly changing. Old materials show signs of depletion, processes change and modern life and business demand new types of paper. Only by intensifying research is it possible to keep abreast of these changes.

The committee, therefore, urges more adequate support of the Forest Products Laboratory by Congress under the provisions of the McSweeney-McNary Research Act, and in addition it submits to the Executive Committee of the American Paper and Pulp Association the following recommendations which bear upon the closer relations with the industry:

1. That steps be taken to secure mill scale trials of such new processes developed at the Laboratory as may meet the approval of a group of outstanding men, experienced in the particular branch of the industry involved.
2. That a representative of the American Paper and Pulp Association be added to the Laboratory staff under a joint fellowship arrangement involving an appropriation by the Association of at least four thousand dollars ($4,000.00) a year for a period of three years and a similar appropriation by the Technical Association of one thousand dollars ($1,000.00) to complete the five thousand dollars ($5,000.00) required.
3. That individual mills be encouraged to establish fellowships, either at the Laboratory or in other research institutions, and that such fellowships be co-ordinated in so far as possible with program outlined to this committee by the Chief of the Pulp and Paper Section of the Laboratory.

R. H. LAFTMAN, CHAIRMAN.

Joint Committee on Approved Pulp Testing Chemists

This committee has prepared rules covering the weighing, sampling and testing of wood pulp which have been approved by its constituent bodies and the Swedish and Finnish Cellulose Associations. It hopes to obtain approval of these proposed rules by the Norwegian Association and then to print them for general distribution as the official rules of the American and Scandinavian Associations.

During the period since the last annual meeting three commercial chemists and ten mill chemists have been accepted by the committee as approved pulp testing chemists.

The committee has had occasion to investigate the character of the weighing, sampling and testing as carried on by two of its approved chemists with the view to maintaining its high standards of pulp testing.

S. GOLDMAN, CHAIRMAN.

PAPER CRISIS BLAMED ON PROMOTION

Julian C. Smith, vice-president and general manager of the Shawinigan Water and Power Company, and retiring president of the Engineering Institute of Canada, informed the members at a meeting in Hamilton, Ont., this week, that unless a more conservative public opinion can be developed the difficulties which have arisen in the pulp and paper industry will spread to other Dominion industries during the present period of rapid development.

He stated that the activities of speculators and promoters in an effort to make financial gain through promotion or sale of securities had placed the industry in its present critical position. "The pulp and paper industry has reached a crisis due to over-construction," he declared.

"From an engineering standpoint the time to have regulated the industry was before added capacity was built. Unless a more conservative public opinion can be developed the same difficulties which have arisen in this particular industry are liable to extend to other Canadian enterprises in this period of intense and rapid development of natural resources."

A. N. STRANGE RESIGNS

A. N. Strange, of Neenah, Wis., has resigned as general manager, secretary and treasurer of the Wolf River Paper and Fiber Company, of Shawano, Wis. He will be succeeded by C. F. Naber, who was elected secretary and treasurer at the annual meeting. Mr. Strange has managed the mill for two and a half years and has decided to withdraw. He and associates purchased the controlling interest in the mill in 1916.

Officers and directors elected for the ensuing years are. President, F. W. Humphrey; vice president, August Anderson; secretary and treasurer, C. F. Naber; directors, P. J. Ladd and E. J. Dempsey.

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Those Who Attended the Convention

Official Registration of the American Paper and Pulp Association

A

Abrams, Allen, Marathon Paper Mills Co., Rothschild, Wis.
Adams, Robert M., Amthor Testing Instrument Co.
Alden, G. R., Dennison Mfg. Co., Framingham, Mass.
Alison, J. M., William Kenyon & Sons.
Allen, A. F., International Paper Co.
Allen, A. L., General Electric Co.
Allison, R. L., U. S. Envelope Co.
Amy, Frank, Lowe Paper Co.
Andrews, F. R., Esleeck Mfg. Co., Turners Falls, Mass.
Artz, W. H., Westinghouse Electric & Mfg. Co.
Aspinwall, Breck, Oxford Miami Paper Co., West Carrollton, Ohio.
Asplund, Gustav, Office of Royal Consulate General of Sweden, New York.
Astley, A. W., Chemical Paper Mfg. Co., Holyoke, Mass.
Atwater, J. R., N. Y. State College of Forestry, Syracuse, N. Y.
Aust, John R., Jr., Champion Coated Paper Co., Hamilton, Ohio.
Austin, Edward H., Bulkley, Dunton Co., New York.

B

Bacon, C. R., Write, Inc., New York.
Bache, E., Waldorf Paper Products Co., St. Paul, Minn.
Bagg, J. L., Millers Falls Paper Co., Millers Falls, Mass.
Baird, P. K., Forest Products Laboratory, Madison, Wis.
Baker, C. M., American Paper and Pulp Association.
Baker, Dr. Hugh P., Trade Association Department, Chamber of Commerce, Washington.
Baker, R. R., Westinghouse Electric & Mfg. Co.
Baker, W. E. Byron, Stein Hall & Co., New York.
Baker, W. N., International Paper Co.
Baldwin, Fred J., Munising Paper Co., Munising, Mich.
Baldwin, H. R., Hammermill Paper Co.
Bardsley, C. P., W. A. Harriman & Co., Inc., New York.
Barker, H. T., Bird & Son, Inc., East Walpole, Mass.
Baron, J. V., Sherman Paper Co.
Barstow, F. L., U. S. Rubber Co.
Bartels, E. F., Munising Paper Co., Munising, Mich.
Bassett, L. A., McLaurin-Jones Co., Brookfield, Mass.
Bates, John S., Price Bros. & Co., Ltd., Montreal, Que.
Bearce, G. D., International Paper Co.
Bechard, E. N., Eastwood Wire Works, Belleville, N. J.
Beck, Edward, Canadian Pulp and Paper Association.
Becker, F., Rhinelander Paper Co., Rhinelander, Wis.
Becker, F. K., Bird Machine Co., South Walpole, Mass.
Becker, F. W., Orono Pulp & Paper Co.
Beckett, Guy H., Beckett Paper Co., Hamilton, Ohio.
Beebe, Clarence, Neumeyer & Dimond.
Behrman, A. S., International Filter Co.
Bennett, E., Valley Iron Works, Appleton, Wis.
Benson, Barnard, Williams Gray Co.
Bentzen, T. C., Whiting-Plover Paper Co., Stevens Point, Wis.
Berger, O. L., G. D. Jenssen Co., New York.
Bergholtz, E. A., American Telephone & Telegraph Co., New York.
Beveridge, J. B., Bonaventure Pulp & Paper Co.
Bhagwat, M. R., Combustion Utilities Corp.
Birchard, W. H., Scutan Co., Brooklyn, N. Y.
Black, Ward E., Hoberg Paper & Fibre Co.
Blanchard, Gordon, Crocker-McElwain Co.
Booker, H. N., Hermann Mfg. Co.
Booth, J. M., Huron Milling Co., Boonton, N. J.
Booth, L. M., Booth Chemical Co.
Borchardt, A. H., Worthington Pump & Machinery Co.
Born, H., A. M. Collins Mfg. Co.
Bosworth, R. L., Chemical Paper Mfg. Co.
Bowen, T. C., Rising Paper Co.
Boyce, Charles W., Woodlands Section, American Paper and Pulp Association.
Bragg, A. O., Oliver Continuous Filter Co., New York.
Brainerd, F. W., Dill & Collins Co., Philadelphia.
Brakewood, H. E., Ohio Boxboard Co., Rittman, Ohio.
Brawn, W. E., Pejepscot Paper Co.
Bray, Mark W., U. S. Forest Products Laboratory, Madison, Wis.
Brazeau, G. S., Appleton Machine Co., Appleton, Wis.
Bromley, Wm. F., Hammermill Paper Co., Erie, Pa.
Brooklyn, A. M., Raffold Co. of America.
Brooks, Charles J., National Adhesive Corp., New York.
Brown, D. K., Neenah Paper Co., Neenah, Wis.
Brown, D. K., Strathmore Paper Co.
Brown, Dr. H. R., New York.
Bryan, C. M., Strathmore Paper Co.
Bugge, S. B., Tomahawk Paper Co., Tomahawk, Wis.
Buhrer, R. A., Union Waxed & Tissue Co.
Bullard, J. G., Dennison Mfg. Co.
Bullock, W. B., Import Committee, New York.
Bunge, Alfred, New York.
Burgen, Jos. H., Rag Content Paper Manufacturers Association, Springfield, Mass.
Burns, Kendrick, S. D. Warren Co.
Burke, J. J., Worthing Pump & Machinery Co.
Burrows, A. A, Burrows Paper Corp., Little Falls, N. Y.
Bush, A. A., E. D. Jones & Sons Co., Pittsfield, Mass.
Bush, Seth L., Crocker-McElwain Co., Holyoke, Mass.
Butler, William E., Havana, Cuba.
Byron, Stanley, Hammermill Paper Co.

C

Cable, Dr. D. E., Oxford Paper Co., Brooklyn, N. Y.
Callahan, O. W., Edgar Bros. Co.
Calligan, J. H., Orono Pulp & Paper Co.
Cameron, E. P., Forest Products Laboratory of Canada, Montreal, Que.
Cameron, J. A., Cameron Machine Co., Brooklyn, N. Y.
Carr, F. W., National Aniline & Chemical Co.
Carter, Geo. H., Public Printer, Government Printing Office.
Carter, W. L., Nashua Gummed & Coated Paper Co., Nashua, N. H.
Casey, H. A., Hampshire Paper Co., South Hadley Falls, Mass.
Catlin, Edgar, Pejepscot Paper Co.
Chabot, C. W., Hammermill Paper Co., Erie, Pa.
Chadwick, Philip H., Chapin & Gould Paper Co.
Chalon, O. T., General Dyestuff Co.
Champion, C. H., Price & Pierce, New York.
Chaplin, M. F., Keyes Fibre Co., Waterville, Me.
Charles, H. L., E-Z Opener Bag Co.
Charron, R. C., U. S. Envelope Co.
Chase, H. A., Brown Co.
Chatain, Henri G., Hammermill Paper Co.
Cheney, Richard S., John A. Manning Paper Co., Troy, N. Y.
Christiansen, Mr., Fibre Making Processes.
Claflin, Lewis L., Erving Paper Mills, Erving, Mass.
Clark, A. B., J. O. Ross Engineering Co.
Clark, F. C., South Manchester, Conn.
Clarke, James B., McDowell Paper Mills.
Clark, K., American Sealkap Co., Long Island City, N. Y.
Clark, Norman, Dooley Mfg. Co., New York.
Cline, M. A., International Paper Co.
Cobb, R. M., Lowe Paper Co., Ridgefield, N. J.
Coffin, A. A., West Virginia Pulp & Paper Co., New York.
Coffin, A. D., C. H. Dexter & Sons, Inc., Windsor Locks, Conn.
Coggeshall, G. W., S. D. Warren Co.
Collins, Grellet, Dill & Collins Co., Philadelphia.
Collins, N. H., National Cellulose Corp., Baldwinsville, N. Y.
Comme, E. R., Pejepscot Paper Co.
Conway, J. M., Hoberg Paper & Fibre Co., Green Bay, Wis.
Cook, A. A., U. S. Testing Co., New York.
Cook, O. L., Lehigh Lime Co.
Cooley, C. H., Taylor-Logan Co., Holyoke, Mass.
Coolidge, P. T.
Coon, E. N., Champion Fibre Co., Canton, N. C.
Cooper, E. C., Electro Bleaching Gas Co., New York.
Cooper, George S., Diamond Alkali Co.
Copeland, S. B., Eastern Mfg. Co., Bangor, Me.
Cornell, John, Paper Mill, New York.
Countiss, F. M., International Paper Co., New York.
Cowles, E. B., American Engineering Co., New York.
Cowie, J. B., Orono Pulp & Paper Co.
Coy, J. H., Flambeau Paper Co., Park Falls, Wis.
Coyle, Thomas, Roessler & Hasslacher Chemical Co.
Crafts, Geo. E., Orono Pulp & Paper Co., Bangor, Me.
Crane, F. G., Crane & Co., Dalton, Mass.
Cronk, James T., Hampden Glazed Paper & Card Co.
Cronkhite, W. W., General Electric Co.
Crossley, T. Linsey, Industrial Laboratories, Ltd.
Crouse, L. W., Paper Makers Chemical Co.
Crowell, W. B., Crowell Corp.
Crown, H. A., Corn Products Refining Co.
Cuddeback, F. E., General Electric Co.
Cummings, F. A., U. S. Envelope Co.
Curran, C. E., Forest Products Laboratory, Madison, Wis.
Curtis, F. A., American Writing Paper Co.
Curtis, F. J., Merrimac Chemical Co.

D

Daley, W. C., Port Huron Sulphite & Paper Co., Port Huron, Mich.
Daniels, A. B., L. L. Brown Paper Co.
Davis, D. S., International Paper Co.
Davis, M. M., Hammermill Paper Co.
Davis, M. W., Anglo-Canadian Pulp & Paper Co.
Davis, R. T., National Sulphite Manufacturers Association.
Davis, S. R., Dells Paper & Pulp Co., Eau Claire, Wis.
Davidson, P. B., Mellen Institute.
Dean, B. W., E. D. Jones & Sons Co.
DeCew, J. A., Process Engineers, New York.
Decker, D. M., E. I. Du Pont De Nemours Co.
Denison, V. S., Paper & Textile Machinery Co.
Dennett, P., Bird Machine Co.
Denton, J. M., Bedford Pulp & Paper Co.
DeWolf, Philip, Joubert & Goslin, New York.
Diament, R. H., Scott Paper Co.
Dickinson, L. R., Staley Sales Corp.
Diggs, John R., Albemarle Paper Mfg. Co., Richmond, Va.
Dines, R. H., National Aluminate Corp.
Dinkelspiel, M. L., National Paper Products Co.
Dixon, L. S., Canadian International Paper Co.
Dobrow, M. C., Writing Paper Manufacturers Association.
Dobson, C. E., Southern Kraft Paper Manufacturers Association, New Orleans, La.
Donaghue, T. F., Warren Mfg. Co., New York.
Donlan, T. H., Detroit Sulphite Pulp & Paper Co., New York.
Donnelley, R. R., Central Waxed Paper Co.
Donovan, F. E., United Paper Co.
Doye, M., Port Alfred Pulp & Paper Co., Port Alfred, Que.
Draudt, H. W., M. Gottesman & Co.
Drew, Arthur B. C., Fairpoint Corp.
Drew, E. G., J. O. Ross Engineering Co.
Dufford, John R., Paterson Parchment Paper Co.
Dunbar, T. L., Canadian Stebbins Engineering & Mfg. Co., Montreal, Que.

E

Eaton, J. H., Foreign Paper Mills, New York.
Eddy, E. B., National Paper Products Co.
Edgar, Harold T., Edgar Bros. Co.
Edmonds, F. J., Wausau Paper Mills, Brokaw, Wis.
Egan, Frank W., John Waldron Corp.
Egan, R. J., Bulkley, Dunton & Co.
Eisner, S. J., Newark Paraffine & Parchment Co., Newark, N. J.
Ekholm, I., National Aniline & Chemical Co., New York.
Eliason, H. D., Central Paper Co., Muskegon, Mich.
Ellerson, H. W., Albemarle Paper Mfg. Co., Richmond, Va.
Eminger, R. L., American Paper and Pulp Mill Superintendents Association.
Emley, Warren E., Bureau of Standards, Washington, D. C.
Enderlein, G. F., Mosinee Paper Mills, Mosinee, Wis.
Engel, Edward, International Paper Co.
Engler, W. N., Western Union Co.
Enslow, L. H., Chlorine Institute, New York.
Erickson, Ernest, Lagerloef Trading Co., New York.
Erickson, Jacob, Atterbury & McKelvey, New York.
Eschelman, C. M., Cameron Machine Co., New York.
Esleeck, I. N., Esleeck Mfg. Co., Turners Falls, Mass.
Estes, L. V., L. V. Estes, Inc.
Evans, W. F., Nashua Gummed & Coated Paper Co., Nashua, N. H.
Everest, D. C., Marathon Paper Mills Co., Rothschild, Wis.
Ewing, R. D. W., American Writing Paper Co., Holyoke, Mass.

F

Fairbanks, S. C., Hammersley Mfg. Co., Garfield, N. J.
Farnsworth, F. C., Farnsworth Co.
Fay, A. F., Parker-Young Co., Boston.
Fellows, C. H., Detroit Edison Co.
Fenska, R. R., New York State College of Forestry.
Fischer, W. M., Curtis & Bro., Newark, Del.
Fiske, Paul S., Parker-Young Co.
Fletcher, Harry E., Fletcher Paper Co., Alpena, Mich.
Fletcher, S. W., J. O. Ross Engineering Corp., New York.
Ford, W. B., American Glue Co.
Fowler, Ralph N., Hampden Glazed Paper Co.
Fox, C. A., Bryant Paper Co., Kalamazoo, Mich.
Frampton, A. E., Hammermill Paper Co.
Franklin, Col. B. A., Strathmore Paper Co., Mittineague, Mass.
Fraser, W. E., National Biscuit Co., New York.
Fritz, E. B., Paper Industry, Chicago.
Frost, J. A., National Paper Products Co.

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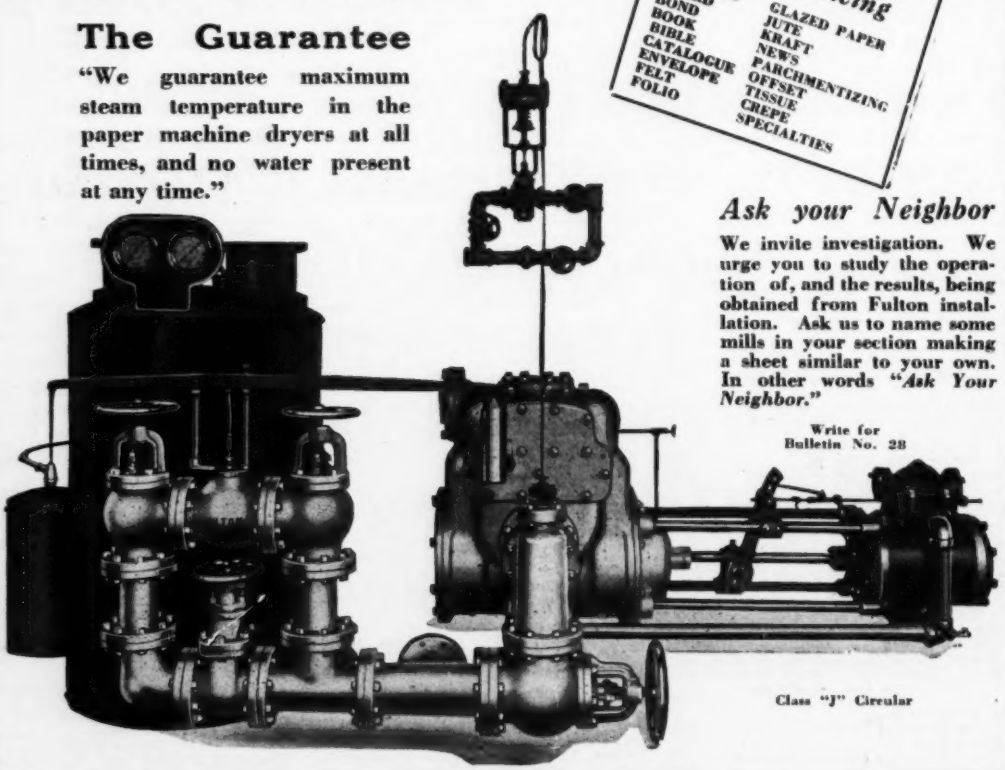

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Guise, Cedric, Cornell University.

H

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Herrlinger, Roth F., Gummed Products Co.
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Hume, Fred W., New York.
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Hummel, J. P., Hummel-Ross Fibre Corp., Hopewell, Va.
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I

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J

Jackson, A. R., Nekoosa-Edwards Paper Co., Port Edwards, Wis.
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Johnson, W. O., Strathmore Paper Co.
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Jones, H. H., Brinn & Jensen Co.
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K

Karges, John J., C. H. Dexter & Sons, Inc.
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L

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Looke, A. C., Valley Paper Co., Holyoke, Mass.
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Lowe, Jos. A., Falulah Paper Co., Fitchburg, Mass.
Luhrs, Albert W., Paper Board Industries Association, New York.
Lynch, Frank R., Munising Paper Co., Munising, Mich.
Lyon, C. E., Hooker Electrochemical Co., New York.

M

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Macdonald, R. G., Secretary, Technical Association of the Pulp and Paper Industry.
Macklem, C. E., Beloit Iron Works, Beloit, Wis.
Macklem, W. W., Black-Clawson Co., Hamilton, Ohio.
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McDowell, Chas., McDowell Paper Mills, Manayunk, Pa.
McDowell, H. G., Pusey & Jones Corp.
McDowell, J. N., Carew Mfg. Co., South Hadley Falls, Mass.
McDonald, B. A., Crown Willamette Paper Co.
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McGilpin, Wm. A., Strathmore Paper Co., Mittineague, Mass.
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Millspaugh, W. H., Paper & Textile Machinery Co., Sandusky, Ohio.
Minor, Jessie E., Writing Paper Manufacturers Association.
Minton, Ogden, Minton Vacuum Dryer Corp., Greenwich, Conn.
Mitchell, H. D., Link-Belt Co., Chicago.
Montabone, A. J. F., Montabone Consulting Engineers.
Moon, D. G., Continental Paper & Bag Corp., New York.
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Morris, H. C., Hercules Powder Co., Wilmington, Del.
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Morse, G. Stanley, Valley Paper Co.
Morterud, Knute, Moss, Norway.
Mosstler, Frank, Allied Paper Mills, Kalamazoo, Mich.
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Munro, W. A., Munising Paper Co.
Munroe, C. F., Franklin Paper Co., Holyoke, Mass.
Munroe, W. N., Groveton Paper Co., Groveton, N. H.

N

Naegeli, Fred, Atterbury Bros., New York.
Nash, Roy A., Menasha Products Co., Menasha, Wis.
Naylor, E. H., Writing Paper Manufacturers Association.
Neumeyer, Wm. E., Neumeyer & Dimond, New York.
Newcomb, G. H., E. I. Du Pont de Nemours Co.
Newhall, C. A., Consulting Chemist, Seattle, Wash.
Nichols, L. B., Hollingsworth & Vose Co.
Nickerson, A. W., Process Engineers.
Nilson, C. N., E. D. Jones & Sons.
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Norton, W. J., American Writing Paper Co.
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Olmsted, George, S. D. Warren Co.
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Ostrander, Geo. N., Finch, Pruyn & Co.
Oxholm, H. H., Department of Commerce.

P

Pagenstecher, Felix, Bryant Paper Co., Kalamazoo, Mich.
Palmer, W. H., Lowe Paper Co., Ridgefield, N. J.
Palmore, R. H., Albemarle Paper Mfg. Co.
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Parsons, J. L., Hammermill Paper Co.
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Patch, Clifford, Orono Pulp & Paper Co.
Pattillo, Donald K., National Aluminate Corp.
Pease, R. L., Brownville Paper Co., Brownville, N. Y.
Perry, C. W., Esleeck Mfg. Co., Turners Falls, Mass.
Peterson, F. C., New York State College of Forestry
Peterson, G. A., International Paper Co., New York.
Peterson, M. F., U. S. Envelope Co.
Phillips, W. E., Mathieson Alkali Co.
Phipps, C. H., Watab Paper Co., Sartell, Minn.
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Pierce, R. C., Crane & Co., Dalton, Mass.
Pierce, T. E., U. S. Envelope Co.
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Piper, W. E., Crystal Tissue Co.
Plaskett, T. A., Forest Products Laboratory.
Plumstead, Jos. E., Jessup & Moore Paper Co.
Pollak, A., West Virginia Pulp & Paper Co., New York.
Pomeroy, B. C., Byron Weston Co., Dalton, Mass.
Popp, G. A., Crystal Tissue Co.
Powell, S. T., Consulting Engineer.
Prescott, J. O., Collins Mfg. Co.
Preston, John F., Hammermill Paper Co.

Q

Quinn, R. J., Mathieson Alkali Works.
Quirk, D. L., Peninsular Paper Co., Ypsilanti, Mich.

R

Rack, H. A., Western Union.
Radsch, R. M., Thilmany Pulp & Paper Co., Appleton, Wis.
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Ramsey, J. B., Jr., Ramsey Paper Co.
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Raney, C. E., Container Corp. of America.
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Raybold, W. J., Rising Paper Co., Housatonic, Mass.
Reale, C. F., Hooker Electrochemical Co., New York.
Recknagel, A. B., Empire State Forest Products Laboratory.
Redfield, Alfred, Munising Paper Co.
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Remley, A. C., Patten Paper Co., Appleton, Wis.
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Rhodes, C. F., International Paper Co.
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Richter, C. F., Paper Makers Chemical Co.
Richter, G. A., Brown Co.
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Robinson, J. T., American Writing Paper Co.
Robinson, J. T., Hollingsworth & Vose Co.
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Rudy, Geo. M., Norwood Engineering Co., Florence, Mass.

S

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Schneider, C. C., Hawthorne Paper Co.
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Schoepfle, C. W., Detroit Edison Co.
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Scott, Geo. A., Scott Paper Co.
Scott, T. Q., Columbia Paper Bag Co.
Scribner, B. W., U. S. Bureau of Standards, Washington, D. C.
Seaman, S. E., Du Pont Rayon Co.
Seidel, G. M., Cherry River Paper Co.
Seiter, Louis L., Bulkley, Dunton & Co.
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Shaw, E. C., Norwood Engineering Co.
Shaw, M. B., U. S. Bureau of Standards.
Sheldon, Ben I., M. Gottesman Co., New York.
Shenk, Dr. M. S., National Adhesive Corp.
Shepherd, John B., Peninsular Paper Co.
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Sherry, Avery, Flambeau Paper Co.
Shoemaker, W. M., Jr., National Vulvanized Fibre Co.
Shuart, John D., Springfield Glazed Paper Co.
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Sigel, Arthur J., M. Gottesman Co.
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Simcoe, George, Edgar Bros. Co., Metuchen, N. J.
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Simons, L. S., Norton Co.
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Sisson, F. T. E., Racquette River Paper Co., Potsdam, N. Y.
Sisson, Geo. W., Jr., Racquette River Paper Co , Potsdam, N. Y.
Sisson, L. H., Racquette River Paper Co., Potsdam, N. Y.
Sjoman, A. E., Filer Fibre Co., Filer City, Mich.
Skinner, H. J., Skinner, Sherman & Esselen.
Skoldebrand, Mr., G. D. Jenssen Co., New York.
Slater, J. H., Escanaba Paper Co., Escanaba, Mich.
Smith, A. F., General Electric Co.
Smith, C. B., Huron Milling Co.
Smith, Carlton W., Miamisburg Paper Co., Miamisburg, Ohio.
Smith, D. A., District of Columbia Paper Mfg. Co., Washington, D. C.
Smith, Edward C., Nashua Gummed & Coated Paper Co., Nashua, N. H.
Smith, Judson B., Marathon Paper Mills Co., Rothschild, Wis.
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Spawn, J. Norman, Champion Fibre Co.
Spence, G. K., New York & Pennsylvania Co., Johnstown, Pa.
Spencer, Geo. H., Milton Vacuum Dryer Corp.
Spickerman, C. W., Whiting-Plover Paper Co., Stevens Point, Wis.
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Stadler, John, Lake St. John Power & Paper Co., Dolbeau, Que.
Staege, S. A., Westinghouse Electric & Mfg. Co.
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Start, L. M., Rice, Barton & Fales.
Steadman, B. K., Standard Paper Mfg. Co., Richmond, Va.
Steltz, R. R., Westinghouse Electric & Mfg. Co.
Stephenson, J. N., Pulp & Paper Magazine of Canada, Gardenvale, Que.
Stevens, F. L., Stevens & Thompson Paper Co., North Hoosick, N. Y.
Stevens, R. H., Bogalusa Paper Co., Bogalusa, La.
Stevens, S. S., Stevens & Thompson Paper Co., North Hoosick, N. Y.
Stevenson, L. T., Mountain Mill Co., New York.
Stone, Norman S., Mosinee Paper Mills Co.
Story, A. P., Chillicothe Paper Co., Chillicothe, Ohio.
Strasser, J. P., Stein Hall Mfg. Co.
Strauss, Edwin G., Artcote Paper Co., Irvington, N. J.
Strong, E. P., Munising Paper Co.
Stuart, Kimberly, Neenah Paper Co., Neenah, Wis.
Summers, L. T., Port Huron Sulphite & Paper Co., Port Huron, Mich.
Summerville, W. D., Eastern Mfg. Co.
Sundell, J. M.
Sutermeister, E., S. D. Warren Co.
Sutherland, D. Manson.
Sutherland, John G., Mead Paper Board Corp.
Swenning, K. A., Mead Forestry Bureau.
Swift, W. E., U. S. Envelope Co.
Switzer, P. Dayton, Moore & White Co.

T

Taggart, Donald C., Bulkley, Dunton & Co.
Tait, Wm. H., Sherman Corp.
Taylor, Alden R., William L. Barrell Co.
Taylor, Frank E., Taylor-Logan Papermakers; Advertisers Paper Mills, Holyoke, Mass.
Taylor, H. S., Dayton, Ohio.
Telfer, E. R., Detroit Sulphite Pulp & Paper Co., Detroit, Mich.
Thom, E. J., Howard Smith Paper Mills.
Thomas, B. M., Container Corp. of America.
Thomas, R. H., Detroit Sulphite Pulp & Paper Co., Detroit, Mich.
Thompson, Alexander, Champion Coated Paper Co.
Thompson, James, U. S. Envelope Co.
Thompson, L. A., Paper Makers Chemical Corp.
Thompson, Sanford E., Thompson & Lichtner.
Tillotsen, C. R., Federal Forest Service.
Townsend, C. W., U. S. Envelope Co.
Traquair, John, Mead Pulp & Paper Co., Chillicothe, Ohio.
Trautschold, R., Paper Trade Journal, New York.
Troop, E. F., P. H. Glatfelter Co., Spring Grove, Pa.
Trunstall, H. W., A. M. Collins Mfg. Co.
Tucker, E. C., Chemical Paper Mfg. Co.; Crocker-McElwain Co., Holyoke, Mass.
Tumy, P. Y., General Electric Co.
Turner, H. E., Defiance Paper Co., Niagara Falls, N. Y.

U

Uber, Docteur, Paris, France.
Uong, D. D., Fitchburg Paper Co., Fitchburg, Mass.
Upham, S. A., Brownville Paper Co., Brownville, N. Y.

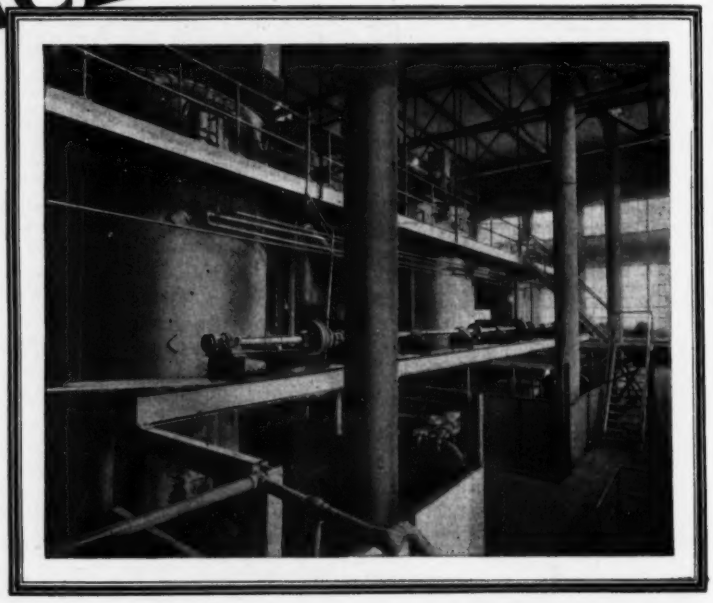
V

Van Duzer, I. O., Louis Dejonge & Co.
Van Horn, J. B., Holyoke Card & Paper Co.
Vaughn, Frank, Bay West Paper Co.
Viergiver, C. D., Stecher Lithographic Co.
Von Hazmburg, R. S., Scott Paper Co.

W

Wade, J. M., General Electric Co.
Wadleigh, Geo. R., West Virginia Pulp & Paper Co., New York.
Wagner, Chas. L., J. O. Ross Engineering Corp.
Waldo, Guy, Flambeau Paper Co., Park Falls, Wis.
Walker, E. C., Collins Mfg. Co.
Walker, E. M., American Writing Paper Co.
Walker, H. G., Western Electric Co.
Wall, A. J., General Electric Co.
Walleck, Mr., Northern Paper Mills.
Walsh, T. C., Hollingsworth & Vose Co.
Wandel, Kurt, National Cellulose Corp., Baldwinsville, N. Y.
Ware, Geo. A., News Print Service Bureau, New York.
Waring, A. N., Bayless Mfg. Corp.; Port Huron Sulphite & Paper Co., New York.
Warner, W. J., Hampden Glazed Paper & Card Co.
Warrick, L. L., Wisconsin Board of Health.
Watson, R. S., Allis-Chalmers Mfg. Co.
Weed, W. J., Electro Bleaching Gas Co., New York.
Wehmer, P. F., Electrical Testing Laboratories, New York.
Wellington, M. A., Fletcher Paper Co.
Wemple, H. R., Texas Gulf Sulphur Co.
Wennberg, E. E., New York State College of Forestry.
West, W. D., E. D. Jones & Sons Co.
Westerguard, J. E., Atterbury & McKelvey, New York.
Weston, Harry E., Paper Industry, Chicago.
Wheat, G. G., Editor and Publisher, New York.
Wheeler, P. B., Franklin Paper Co., Holyoke, Mass.
Wheeler, T. B., A. P. W. Paper Co., Albany, N. Y.
Wheeler, Wm. A., A. P. W. Paper Co., Albany, N. Y.
Wheelwright, Geo. W., Geo. W. Wheelwright Paper Co.
White, W. B., White, Washburn Co.
Whitney, B. S., Bird & Son, Inc.
Whittington, E. F., Sutherland Paper Co., Kalamazoo, Mich.
Wholean, G. R., Strathmore Paper Co.
Wickham, A. W., MacAndrews & Forbes, Camden, N. J.
Wilcox, D. A., Oxford Paper Co., New York.
Wiley, Brent, Westinghouse Electric & Mfg. Co.
Wilkins, R. A., Bird & Son, Inc.
Wilkinson, W. N., Supply and Equipment Section, American Paper and Pulp Association, New York.
Willetts, W. R., Oxford Paper Co., Brooklyn, N. Y.
Williams, F. A., U. S. Envelope Co.
Williams, F. M., Williams Apparatus Co.
Williams, W. V., Beckett Paper Co., Hamilton, Ohio.
Williamson, G. E., Strathmore Paper Co.
Willson, S. L., American Writing Paper Co., Holyoke, Mass.
Wilmer, F. P., Albemarle Paper Mfg. Co.
Wilson, Norman W., Hammermill Paper Co., Erie, Pa.
Wingate, H. A., C. H. Dexter & Sons, Inc.
Winslow, C. P., Forest Products Laboratory.
Winslow, F. E., General Electric Co.
Wolf, R. B., Pulp Bleaching Corp., New York.
Wood, F. L., U. S. Rubber Co.
Wood, L. G., Northern Paper Mills, Green Bay, Wis.
Woodruff, J. B., Holyoke, Mass.
Woodsome, J. O., Penberthy Injector Co.
Woodson, W. S., Jr., Albemarle Paper Mfg. Co.
Worcester, C. H., Munising Paper Co.
Wuenschel, J. F., Hammermill Paper Co.
Wyatt, C. D., Paper Industry, N. Y.

ALBERENE FURNACE LININGS



An installation of Wagner Furnaces in which Alberene Furnace Linings are used

Among the Large Users of Alberene Furnace Linings Are:—

Advance Bag & Paper Company
Bathurst Company, Ltd.
Bogalusa Paper Company, Inc.
Brompton Pulp & Paper Co., Ltd.
Brown Paper Mill Company, Inc.
Canadian Cellulose Company, Ltd. (Soda Mill)
Central Paper Company
Champion Fibre Company
Crown-Willamette Paper Company
Dryden Paper Company, Ltd.
E-Z Opener Bag Company
Falls Manufacturing Company
Filer Fibre Company
Longview Fibre Company
Minnesota & Ontario Paper Co.
Nekoosa-Edwards Paper Co., Inc.
Ontonagon Fibre Company
Southern International Paper Co.
Southern Paper Company
St. Helens Pulp & Paper Company
Thilmany Pulp & Paper Company
Tomahawk Pulp & Paper Company
Vancouver Kraft Mills
Wausaw Sulphate Fibre Company
Wayagamack Pulp & Paper Co., Ltd.
Yellow Pine Paper Mill Company
Union Bag & Paper Power Corp.

STANDARD FOR NEW FURNACES AS FOR OLD TYPES

Alberene Stone—because of its high compressive strength, low coefficient of expansion, and high chemical resistivity—continues to be the most satisfactory material for furnace linings. Since the advent of the black ash smelter, no manufactured material has duplicated the physical and chemical properties of Alberene. The partial list of mills using Alberene, here given, proves its wide-spread acceptance as the standard material for the purpose. Let our engineers work with you.

ALBERENE STONE COMPANY
153 WEST 23rd STREET, NEW YORK, N.Y.

GENERAL PAPER MERCHANTS MEET

National Paper Trade Association of the U. S. A. Holds Twenty-Sixth Annual Convention at The Waldorf-Astoria Hotel, New York

H. W. Mathewson, of the Paper Supply, Minneapolis, Minn., Is Chosen President for the Ensuing Year—K. S. Warner, of John F. Sarles Co., New York, Heads Fine Paper Division and A. W. Blackman, of D. F. Monroe Co., Boston, Wrapping Paper Division—Charles Addoms, of Miller & Wright Paper Co., New York, Is Made Treasurer—All of the Sessions Are Well Attended By Representative Paper Merchants.

H. W. MATHEWSON, was chosen president at the twenty-sixth annual meeting of the National Paper Trade Association at the Waldorf-Astoria February 19-20. Other officers elected were:

Vice President, In Charge of Fine Paper Division, K. S. Warner, John F. Sarles Company, New York.

Vice President, In Charge of Wrapping Paper Division, A. W. Blackman, D. F. Munroe Company, Boston.

Treasurer, Charles Addoms, Miller & Wright Paper Company, New York.

PRESIDENT'S ADDRESS

W. N. Gillett, the retiring president of the association delivered his annual address as follows:—

Those who attended the splendid meetings of the Fine Paper and the Wrapping Paper Divisions yesterday and this morning could assume quite naturally that I had plagiarized on some of the remarks made at those two meetings, independently and in complete ignorance of what was to be said at those times. It only indicates that there are certain fundamentals along which we are all thinking, and I do not think they can be emphasized and reiterated too often.

It is customary and eminently proper for the President at the annual meeting, to render a report of the activities of this Association under his administration, but the Association's staff is now so organized as to make unnecessary a detailed statement from me as to the work done and progress made during the past year.

Our executive Secretary is in constant intimate contact with not only the activities of the National, but also with each of the local associations and his report will set forth what has been accomplished and the present status of affairs.

My work as President has been infinitely lightened by the efficiency, loyalty, and dependability of the Executive Secretary, and his assistant, his co-workers, our legal advisor, and that of the Vice President in charge of the Wrapping and Fine Paper Divisions.

I most sincerely appreciate their support and commend their services to you.

No officer has devoted more time, thought and effort to this association than has our Treasurer, Charles Addoms. He has established a sound basis for the allocation of dues and put the Association finances in excellent condition. He deserves the utmost credit for his constructive work.

H. W. MATHEWSON, PRESIDENT

Loss By Death

During the past year death has taken a heavy and sad toll from our membership. Several of our oldest, most respected members have gone and our ranks have been weakened by the loss of some of our staunchest, most loyal and capable younger men. We feel keenly their loss. This Association and their own associates will miss their presence and counsel and our hearts go out to those near and dear ones they have left behind.

While I am deeply conscious that during the past year we have succeeded but partially in carrying out the objectives that have been our aim, nevertheless, I know that this Association stands today stronger, of greater value and importance and more indispensable than ever before. It is of vital necessity to the welfare and progress of the paper merchant and every member for his own interests and the interest of the trade, should give it his loyal support.

There have developed in the business of today so many radical and unforeseen changes involving methods of merchandising and distribution and business has become so competitive, both in price and service, with consequent low margins of profit, that it is only by keeping

"Too much of our handling is still performed *by hand*"..

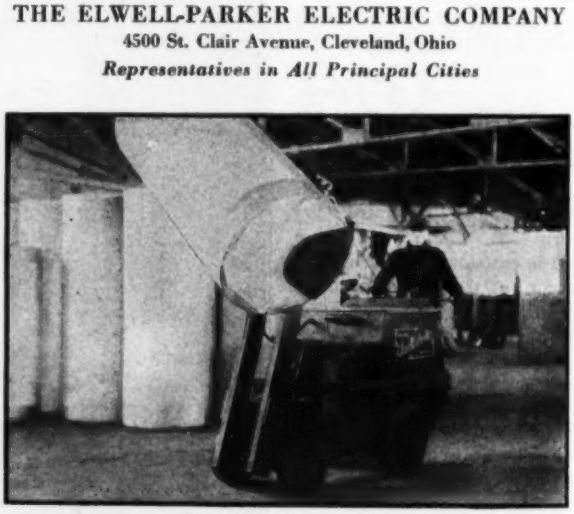
"Wages paid our truckers today are based on the amount of work they can perform with *power* machines at their disposal. Too much of our handling is still performed *by hand*. That's what boosts the cost, sir."

In this way, the finishing and loading foreman of a moderate sized mill explained the high costs of his department to the General Manager.

And the soundness of the foreman's analysis was demonstrated later when an Elwell-Parker Tructor was put to work in his department. Four men from the finishing and loading force were put on more profitable work. This made a saving of 14 cents on every ton of paper shipped. In a single year the saving more than paid the total cost of the Elwell-Parker Tructor — and the Tructor has many, many years of usefulness still ahead of it.

In your own mill, is too much handling still performed by hand? Would you like to know, in *dollars and cents*, just what savings Elwell-Parkers can bring to your business? The nearest E-P Sales Engineer will be pleased to analyze the situation — and give you the facts. No cost or obligation. Phone him or write direct to us.

THE ELWELL-PARKER ELECTRIC COMPANY
4500 St. Clair Avenue, Cleveland, Ohio
Representatives in All Principal Cities



ELWELL-PARKER TRUCTORS

PIONEERS IN ELECTRIC TRUCTOR MANUFACTURE

pace with the times, utilizing modern methods of management and efficiency and by cooperation that we can maintain our position in distribution and make a reasonable profit from our operations.

Channels of distribution have developed as they exist today because in general they furnish the most economical and expeditious method of getting goods from producers into the hands of the consumers. More direct methods of distribution for the prospective elimination of some intermediaries are often suggested. In general, the functions performed by these intermediaries are necessary and even should distribution be effected under single ownership, the function would still have to be performed, and so there is no doubt of the economic value and necessity of the paper merchant in the distribution of paper.

His functions are warehousing, financing, assuming market risks and furnishing expert market and sales service, which comes from his intimate knowledge of the conditions in his locality.

FRANK FLOYD, SECRETARY

These functions are necessary and when properly performed by him are less costly than these same functions performed by the manufacturer.

Local Cooperation Needed

While in detail, conditions differ in different markets and so call for a high order of local cooperation. There are also problems arising out of distribution in general that affect all markets alike and these problems require cooperation between manufacturers' and merchants' national associations.

As related to the latter, the problems of the manufacturer and the wholesaler are so interrelated and interwoven as to be the problems of both, and it is only by a mutual understanding of these problems and a desire and willingness to work them out together that the best results for all can be accomplished.

Frequently, sometimes unknowingly, each creates conditions for the other and often the conditions so created are considered the faults or shortcomings of the other.

Manufacturers Create Problems

Manufacturers create problems for the wholesaler and consider the difficulties that inevitably arise as a fault of the wholesaler or the distributing system, and conversely, the wholesaler by his failure to properly discharge his functions and obligations creates problems for the manufacturer.

Franklin D. Jones in his address before the National Paper Trade Association in October, 1928, pointed out many of the conditions brought about by the manufacturer and which affect distribution.

He stated: "The manufacturers who do not regulate and control their production to the extent that they are permitted to by law, dump upon the wholesale and retail markets an unnecessary surplus. They are thus creating chaos in business. That responsibility is in a measure theirs. Those manufacturers who sell through the long established wholesale channels and then seek their distribution through their retail customers at prices which make it impossible for the wholesalers to sell to them, are destroying the good will and the capital investment of the wholesalers. The result is not the wholesaler's responsibility. The manufacturers in an effort to seek volume spread out into innumerable chanels of distribution instead of utilizing the well-established channels, and thus work havoc in the distribution system.

"When manufacturers discriminate in their prices, for example, between wholesalers and other great distributing organizations, the difference in price not being based upon actual economies effected through them, they are upsetting the normal operations of our distribution scheme. Now, I say that, gentlemen, not in the slightest criticism of the manufacturer. I know what it is to have these things, it is very difficult for the manufacturer to in any way reach them; as to others it is impossible. I say that simply in support of my premise that when you come to this problem of distribution, it is a problem which weighs heavily and with equal responsibility upon the manufacturer and distributor, and it is the solution of it that calls for mutual confidence, mutual good will, and mutual effort on the part of all.

Wholesaler Contributes

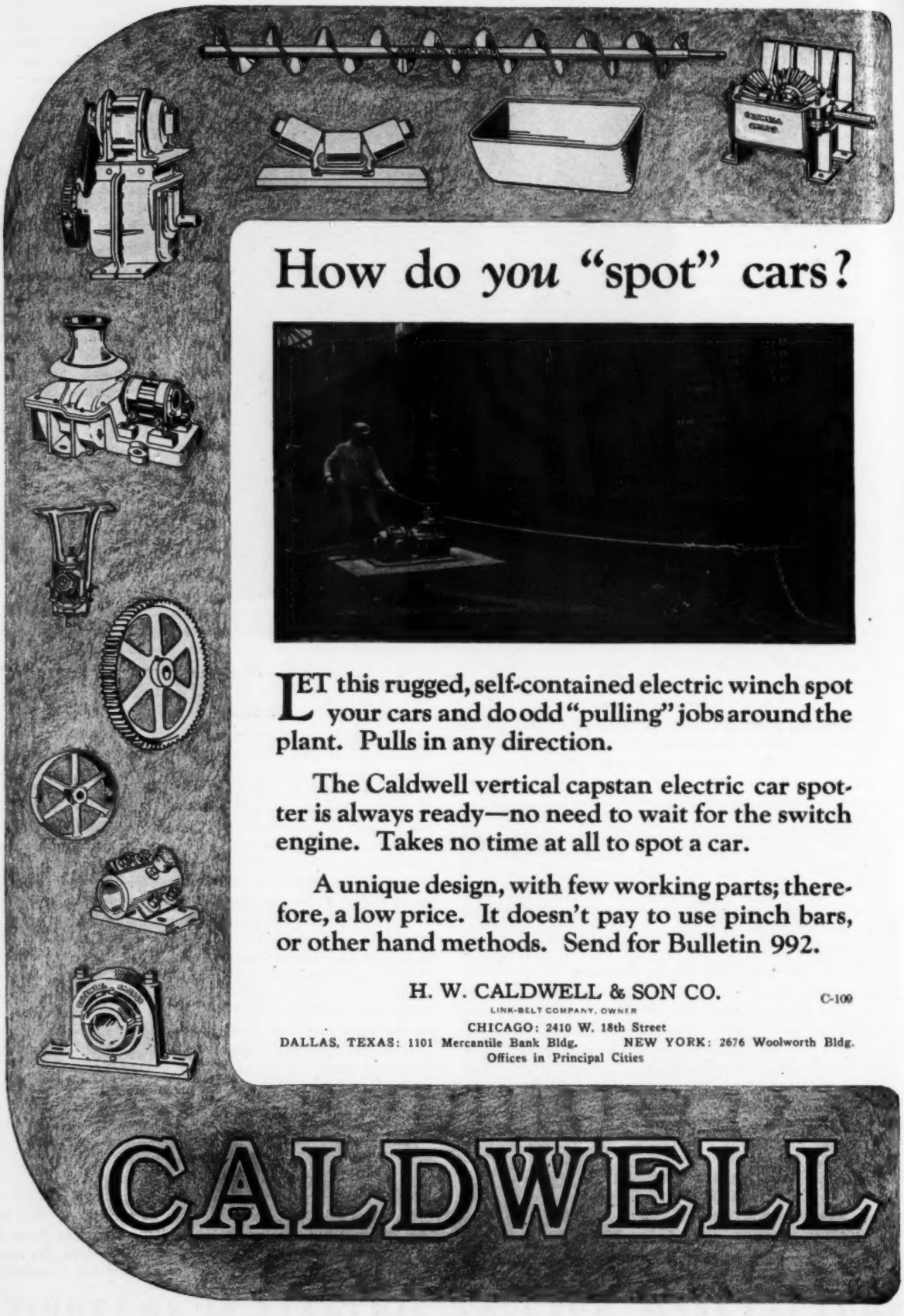
"The wholesaler is likewise contributing to this situation by his failure to fully and properly discharge his functions and obligations.

"Too frequently, he fails to protect and support wholeheartedly the manufacturers who work with him, but rather tried to buy goods solely at the lowest price. Often he fails to follow up business created by the manufacturers' advertising and promotion work, and possibly even divert such business to other mills. His stocks are not always adequate to serve properly and customers are made to wait for mill shipments. Merchants often carry conflicting and duplicating lines, causing increased investment, reduced turnover, and inadequate volume to such connections. Lines handled on an exclusive basis are not always given the effort to which they are entitled. There has been too much jobbing and not enough merchandising; thus the merchant fails to fully discharge his functions and contributes to the problems of the manufacturer.

"Good merchandising is the shortest line of distribution between the manufacturer and the consumer and should be orderly and profitable distribution. The merchants should concentrate on well rounded lines, sell consistently and support the mills who have a consistent selling policy. He should concentrate in his natural territory and develop an aggressive and creative sales organization.

An Important Field of Endeavor

"Other industries through studies of market conditions and simplification and standardization methods have increased their business and made it more profitable, and there remains much that the paper merchant and this Association can do along this line, in fact, this is one of the most important fields of our endeavor.



How do *you* "spot" cars?

LET this rugged, self-contained electric winch spot your cars and do odd "pulling" jobs around the plant. Pulls in any direction.

The Caldwell vertical capstan electric car spotter is always ready—no need to wait for the switch engine. Takes no time at all to spot a car.

A unique design, with few working parts; therefore, a low price. It doesn't pay to use pinch bars, or other hand methods. Send for Bulletin 992.

H. W. CALDWELL & SON CO. C-100

LINK-BELT COMPANY, OWNER

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DALLAS, TEXAS: 1101 Mercantile Bank Bldg. NEW YORK: 2676 Woolworth Bldg.

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CALDWELL

"As the problems of distribution are the problems of both the manufacturer and the merchant, this Association can be of the utmost value by developing a contact between proper committees of both groups, the function of which joint committees would be to analyze their mutual problems and work out solutions where possible.

"It has been demonstrated many times that when manufacturers' and merchants' committees meet together, establish a common basis of understanding, appreciate each other's situation and work out a sound plan, recognizing reciprocal obligations, that constructive results are accomplished.

"It is my opinion that this Association will find its greatest field of usefulness to be market analysis, for the purposes of simplification and standardization, perfecting and introducing of cost systems, promotion of efficiency methods and establishing a more frequent and closer contact with manufacturers' committees. All these things will promote the welfare of each member of the Association and elevate the paper industry.

Cooperation Needed

"The strength and progress of this Association depends not so much on its officers, committees, and staff, as it does on the support, interest, and cooperation of its members. No man seeks an office but when he accepts it he obligates himself to give to it the best that is in him, no matter what responsibility, labor, strain, or possible embarrassment may be involved. The members likewise have a definite obligation to contribute their interested loyal support to the officers they select and only when each discharges his obligation can the full strength of this Association be realized.

"I sincerely appreciate the cooperation that has been extended to the officers and committees during the past year, and to our new officers I extend my best wishes, and I am confident that I can pledge them your support."

Those Who Attended the Convention

Official Registration of the National Paper Trade Association

A

Aaronson, August, Aaronson Bros., New York.
Addoms, Charles, Miller & Wright Paper Co., New York.
Alcorn, Jas. E., Alling & Cory Co., Cleveland, Ohio.
Alling, Joseph T., Alling & Cory Co., Rochester, N. Y.
Andrews, C. R., C. R. Andrews Paper Co., Pittston, Pa.
Andrews, C. Warren, Industrial Paper Co., Baltimore, Md.
Andrews, E. W., C. R. Andrews Paper Co., Pittston, Pa.
Andrews, R. P., R. P. Andrews Paper Co., Washington, D. C.
Austin, Harold L., Alling & Cory Co., Rochester, N. Y.

B

Baldwin, Charles H., Conrow Bros., New York.
Baker, Hugh P., Trade Association Dept., Washington, D. C.
Barrett, Nicholas, Thomas Barrett & Son, New York.
Barton, B. W., Barton, Duer & Koch Paper Co., Baltimore, Md.
Beck, Louis, Charles Beck Co., Philadelphia, Pa.
Beckwith, C. L., H. W. Carter Paper Co., Springfield, Mass.
Beckwith, R. M., Minneapolis Paper Co., Minneapolis, Minn.
Beggs, G. E., Hubbs & Hastings Paper Co., Rochester, N. Y.
Beggs, G. E., Hubbs & Hastings Paper Co., Rochester, N. Y.
Bennett, Edward D., Carter, Rice & Co. Corp., Boston, Mass.
Berkowitz, Ben S., Central Paper Co., Newark, N. J.
Berlau, M., Berlau Paper House, Kansas City, Mo.
Bensley, F. E., Federal Paper & Twine Co., Akron, Ohio.
Binford, W. W., Andrews Paper Co., Boston, Mass.
Blackman, Arthur, D. F. Munroe Co., Boston, Mass.
Blandy, Graham, 2nd, Chas. A. Esty Paper Co. Div., Worcester, Mass.
Bleker, Chas. M., Mack-Elliott Paper Co., St. Louis, Mo.
Bond, B. F., Jr., B. F. Bond Paper Co., Baltimore, Md.
Bouis, H. E., Florida Paper Corp., Jacksonville, Fla.
Bradley, Jas. E., Bradley-Reese Co., Baltimore, Md.
Brown, Arthur L., Diem & Wing Paper Co., Cincinnati, Ohio.
Brown, Chas. D., Bradner, Smith & Co., Chicago.
Brown, Herbert S., Carter, Rice & Co. Corp., Boston.
Burke, John C., Baltimore Paper Co., Baltimore, Md.
Burt, P. A., Cleveland Paper Co., Cleveland, Ohio.
Byrne, Matthew O., Whitney Bros., Inc., Boston.

C

Carpenter, A. E., Carpenter Paper Co., Omaha, Neb.
Carpenter, J. A., Kansas City, Mo.
Caskey, J. V., Dixie Drinking Cup Co., Easton, Pa.
Caskie, G. E., Jr., Caskie-Dillard Co., Lynchburg, Va.
Cate, Frank C., Andrews Paper Co., Boston.
Chandler, Alan, Alling & Cory Co., Pittsburgh, Pa.
Clarke, Geo. S., Central Michigan Paper Co., Grand Rapids, Mich.
Clayton, Robert G., Sheridan-Clayton Paper Co., St. Joseph, Mo.
Clerk, Geo. S., Hudson Valley Paper Co., Albany, N. Y.
Cleveland, W. G., E. C. Palmer & Co., Ltd., New Orleans, La.
Clifford, Scot B., C. P. Lesh Paper Co., Indianapolis, Ind.
Colton, Louis A., Zellerbach Paper Co., San Francisco, Cal.
Considine, N. A., Paper House of Penna., Philadelphia.
Cook, H. M., Vandewater Paper Co., New York.
Corning, A. J., Hubbs & Corning Co., Baltimore, Md.
Cree, F. K., Alling & Cory Co., Pittsburgh, Pa.

D

Damon, Allen C., Paul E. Vernon & Co., New York.
Dearden, C. W., Rourke-Eno Paper Co., Hartford, Conn.
Donoghue, W. J., Detroit Paper Co., Detroit, Mich.
Duer, A. A., Barton, Duer & Koch Paper Co., Baltimore, Md.

E

Eaton, E. A., A. M. Eaton Paper Co., Boston.
Ebbets, Wm. E., Coy, Disbrow & Co., Inc., New York.
Elias, Harry, Harry Elias & Co., New York.
Epes, T. H., Epes-Fitzgerald Paper Co., Richmond, Va.
Esty, Charles A., Carter, Rice & Co. Corp., Boston.

F

Field, C. R., Field, Hamilton, Smith Paper Co., Omaha, Neb.
Fox, Geo. S., Pilcher-Hamilton Paper Co., Chicago.
Franc, Jerome, Franc-Graham Paper Co., Inc., New York.
Frank, Chas. S., Washington Paper Co., Washington, D. C.
Friedman, J., City Paper Co., Birmingham, Ala.
Fuhlage, Alfred E., Beacon Paper Co., St. Louis, Mo.

G

Gardner, Leroy L., R. L. Greene Paper Co., Providence, R. I.
Gaseon, Martin D., Alling & Cory Co., Cleveland, Ohio.
Geddey, George H., Beecher, Peck & Lewis, Detroit, Mich.
Gillett, W. N., Chicago Paper Co., Chicago.
Gould, H. E., Aldine Paper Mills, Inc., New York.
Grazelle, William R., Holland Paper Co., Buffalo, N. Y.

H

Hall, Arthur C., John Carter & Co., Inc., Boston.
Hall, Edgar A., Jr., Zellerbach Paper Co., San Francisco, Cal.
Ham, Arthur E., Arthur E. Ham & Sons, Boston.
Ham, Herbert C., Arthur E. Ham & Son, Boston.
Hamilton, W. C., Pilcher-Hamilton-Daily Co., Chicago.
Hanlon, Lon L., Alling & Cory Co., Buffalo, N. Y.
Hearn, F. E., Hearn Paper Co., Youngstown, Ohio.
Hearn, R. M., Hearn Paper Co., Youngstown, Ohio.
Helmer, Harold, Beecher, Peck & Lewis, Detroit.
Herringler, Ed. F., Union Selling Co., Cincinnati, Ohio.
Herrmann, W. J., E. A. Bover Co., Milwaukee, Wis.
Hoel, Ernest H., Carpenter Paper Co., Omaha, Neb.
Holden, Wm. H., Geo. W. Millar & Co., New York.
Hopkins, Forest, Paper Mills Co., Chicago.
House, A. J., Union Paper & Twine Co., Detroit, Mich.
Hubbard, C. B., B. F. Bond Paper Co., Baltimore, Md.
Hurlbut, Hartley A., Hurlbut & Hatfield, Boston.

I

Ihsen, H. G., Hubbs & Howe Co., Cleveland, Ohio.
Isen, N. P., Enterprise Paper Co., Philadelphia, Pa.

J

Jamison, F. T., Interstate Cordage & Paper Co., Pittsburgh, Pa.
Johnston, Dean Y., Chatfield Paper Corp., New York.
Johnston, Robert S., Old Dominion Paper Co., Norfolk, Va.
Jones, H. L., Dixie Drinking Cup Co., Easton, Pa.
Jones, J. B., Western Paper Co., Omaha, Neb.
Judd, B. A., Petrequin Paper Co., Cleveland, Ohio.

K

Keffer, Harry G., Johnston Paper Co., Harrisburg, Pa.
Kehn, A. B., Enterprise Paper Co., Paramount Paper Products Co., Philadelphia.
Keil, Harold W., Millcraft Paper Co., Cleveland, Ohio.
Kennedy, T. F., S. Walter, Inc., Philadelphia.
Kettles, R. C., Jr., Chas. F. Hubbs Co., New York.
Knight, J. W., Knight Bros. Paper Co., Jacksonville, Fla.
Koch, Chas. F., Barton, Duer & Koch Paper Co., Washington, D. C.
Kneustner, Charles, Kneustner, Lucie Paper Co., New York.
Kourth, Harry L., S. Walter, Inc., Philadelphia.
Kullman, G. K., American Paper Co., Milwaukee, Wis.
Kuster, John F., Andrews Paper Co., Boston.

L

Landau, D. S., Alling & Cory Co., New York.
Larsen, V. H., Crescent Paper Co., Indianapolis, Ind.
Lazenby, Eugene H., Industrial Paper Co., Baltimore, Md.
Leal, John T., Sutphin Paper Co., Inc., New York.
Lenderking, W. R., Tulip Cup Corp., New York.
Lesh, Perry W., C. P. Lesh Paper Co., Indianapolis, Ind.
Leslie, A. W., John Leslie Paper Co., Minneapolis, Minn.
Liebman, M., Gotham Card & Paper Co., Jersey City, N. J.
Likins, G. R., Springfield Paper Co., Springfield, Mo.
Linde, Bertram E., J. E. Linde Paper Co., New York.
Lindenmeyr, F., Henry Lindenmeyr & Sons, New York.
Lipscomb, B. W., Richmond Paper Co., Richmond, Va.
Logan, Alfred W., Providence Paper Co., Providence, R. I.
Lucie, Gustav, Kuenstner & Lucie, New York.

M

Mahon, L. D., B. F. Bond Paper Co., Baltimore, Md.
Mallalieu, J. C., Geo. W. Millar & Co., Inc., New York.
Maltz, Harry, Houston Paper Co., Houston, Tex.
Manz, G. A., Jr., S. B. Garrett Co., Syracuse, N. Y.
Marquardt, Oswald F., Marquardt, Blake & Decker, Inc., New York.
Marshall, Louis J., Marshall Paper Co., Appleton, Wis.

An Announcement

KARL A. LEFREN, Consulting Engineer, takes pleasure in announcing the incorporation of his business, under the firm name of:

KARL A. LEFREN, INC.

Consulting Engineers

171 Madison Avenue
New York, N. Y.

Whose Officers are:

Karl A. Lefren,	***President,***
John E. Giffels,	***Vice President,***
Wilfred Wyburn,	***Treasurer,***
Francis H. Lewis,	***Secretary.***

Mr. Lefren wishes to extend his hearty thanks to his Clients and all others who have helped to make this business a successful one, and expresses the hope that they will extend to the new Corporation their continued confidence and cooperation.

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Mathewson, H. A., Paper Supply Co., Minneapolis, Minn.
McGehlis, C. G., Jacksonville Paper Co., Jacksonville, Fla.
McGrath, Robert E., Joseph I. Grady, Inc., New York.
McGraul, T. A., D. P. Winne Co., New York.
McIntosh, W. M., Bradner, Smith Co., Chicago.
McKinney, Geo., F. A. Flinn, Inc., New York.
McLaughlin, W. C., Chatfield & Woods Co., Cincinnati, Ohio.
McCellan, W. J., Carter, Rice & Co., Boston.
Mead, Ernest C., Richmond Paper Co., Richmond, Va.
Merriam, Edward J., Merriam Paper Co., New York.
Merrill, Frank H., Andrews Paper Co., Boston.
Meyer, Karl F., Schwarz Paper Co., Lincoln, Neb.
Meyer, S. L., Louisiana Paper Co., Ltd., Shreveport, La.
Miller, James H., Standard Envelope Mfg. Co., Cleveland, Ohio.
Miller, Albert.
Miller, J. F., Chope, Stevens Paper Co., Detroit, Mich.
Milligan, R. E., Seaman, Patrick Paper Co., Detroit, Mich.
Moody, W. F., G. W. Moody & Son, New Castle, Pa.
Moore, C. B., The Tuttle Co., Burlington, Vt.
Morrissett, R. B., Dillard Paper Co., Inc., Greensboro, N. C.
Morterud, B., Morterud & Son, Moss, Norway.
Moss, L. H., Atlanta Paper Co., Atlanta, Ga.
Mueller, G. A., Midland Paper Co., Chicago.
Muns, Raymond, American Paper Co., Inc., Richmond, Va.
Myers, R. E., R. M. Myers & Co., Rochester, N. Y.

N

Nacht, J., Union Card & Paper Co., New York.
Nesbitt, A. T., Cincinnati Cordage & Paper Co., Dayton, Ohio.
Newell, H. T., Jackson Paper Co., Jackson, Miss.
Newfang, C. A., Canfield Paper Co., New York.
Newhall, Chas. A., Consulting Chemist, Seattle, Wash.
Nolte W. J., Consolidated Paper & Box Co., Richmond, Va.

O

Orchard, Chas. P., Orchard Paper Co., St. Louis, Mo.

P

Parsons, F. F., F. F. Parsons Paper Co., Washington, D. C.
Payne, F. Dana, Daka Paper Co., Erie, Pa.
Pollock, Lawrence S., Pollock Paper & Box Co., Dallas, Tex.
Pomerance, Michael, Forest Paper Co., New York.
Pratt, D. W., Butler Paper Corp., Chicago.

R

Reeves, Bert E., Alling & Cory Co., Rochester, N. Y.
Robinson, Harold R., C. H. Robinson Co., Portland, Me.
Roesch, Henry, Roesch Paper Co., Tampa, Fla.
Roesch, R., Union Paper & Twine Co., Cleveland, Ohio.
Rogers, L. E., Bowes Bros., Inc., Utica, N. Y.
Rosenthal, Nathan, Rosenthal Paper Co., St. Louis, Mo.
Rust, B. C., Barton, Duer & Koch Paper Co., Baltimore, Md.

S

St. Clair, W. D., Alling & Cory Co., Pittsburgh, Pa.
Schaefer, Wm., R. P. Andrews Paper Co., Washington, D. C.
Schillinger, H. Newton, Bradley-Reese Co., Baltimore, Md.
Schlosser, Morris, M. & F. Schlosser Paper Corp., New York.
Schmidt, E. J., Parker, Thomas, Tucker Paper Co., Chicago.
Schoff, C. E., San Antonio Paper Co., San Antonio, Tex.
Schuman, Louis, Manhattan Card & Paper Co., New York.
Schwartz, Leo, Schwartz Paper Co., Muncie, Ind.
Schwarz, C. F., Schwarz Paper Co., Lincoln, Neb.
Seaman, Clayton, Seaman Paper Co., Chicago.
Seinsheimer, Walter, Seinsheimer Paper Co., Cincinnati, Ohio.
Severance, H. J., Hubbs-Howe Co., Buffalo, N. Y.
Sexton, F. W., Tuttle Co., Hudson Falls, N. Y.
Shaw, Charles A., Whitney Bros., Inc., Boston, Mass.
Sherman, John R., Antietam Paper Co., Inc., Jacksonville, Fla.
Sherrill, A. B., Riegel & Co., Inc., Philadelphia, Pa.
Sibley, W. T., Alling & Cory Co., Buffalo, N. Y.
Skinner, Geo. W. T., Skinner & Co., New York.
Smith, Thos. F., Louisville Paper Co., Louisville, Ky.
Smythe, T. H. B., J. L. N. Smythe Co., Philadelphia.
Spaulding, C. A., Carpenter Paper Co., Des Moines, Iowa.
Steadman, W. J. E. Linde Paper Co., New York.
Stetson, William, Jr., Storrs & Bement Co., Boston.
Streibert, Henry, Streibert Paper Co., Albany, N. Y.
Stroth, Geo. H., New York Paper Co., Baltimore, Md.
Stuhlreyer, P. A., Diem & Wing Paper Co., Cincinnati, Ohio.
Swigart, John D., Swigart Paper Co., Chicago.

T

Tayloe, Alfred D., Tayloe Paper Co., Memphis, Tenn.
Tayloe, Geo. G., Tayloe Paper Co., Memphis, Tenn.
Thomas, A. C., F. A. Flinn, Inc., New York.
Thompson, Fred. K., Cramer-Force Co., Rochester, N. Y.
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V

Verchow, H. A., Nashua Gummed & Coated Paper Co., Nashua, N. H.

W

Waite, Clayton T., John Carter & Co., Inc., Boston.
Waite, Harrie E., John Carter & Co., Inc., Boston.
Walton, R. L., D. S. Walton & Co., New York.
Warner, L. S., John F. Sarle Co., Inc., New York.
Washburn, H. A., Messinger Paper Co., Chicago.
Webb, Geo. S., Storrs & Bement Co., New Haven, Conn.
Weil, Max W., Union Paper & Twine Co., Cleveland, Ohio.
Wellhouse, Sidney L., National Paper Co., Atlanta, Ga.
Wellington, Roger H., Alling & Cory Co., Rochester, N. Y.
Wells, Jas. L., Sloan Paper Co., Atlanta, Ga.
Welsh, John H., Cleveland Paper Co., Cleveland, Ohio.
White, William W., James White Paper Co., Chicago.
Whitney, H. B., Whitney Paper Co., Wichita, Kan.
Wiggins, M. V., Crescent Paper Co., Indianapolis, Ind.
Wilcox, C. W., Wilcox, Walter, Furlong Paper Co., Philadelphia.
Wilcox, W. S., Wilcox, Furlong Paper Co., Philadelphia.
Wilder, C. A., Wilder Bros. Co., Philadelphia, Pa.
Williams, W. D., Southeastern Paper Co., Louisville, Ky.
Willis, T. F., Willis & Weber Paper Co., Kansas City, Mo.
Wilson, B. W., B. W. Wilson Paper Co., Richmond, Va.
Wittrock, C. J., Paragon Paper Co., Cincinnati, Ohio.
Wolbrette, Jules, Southern Paper Co., New Orleans, La.

Z

Zellerbach, H. L., Zellerbach Paper Co., San Francisco, Cal.
Zimmerman, J. W., Standard Paper Co., Cincinnati, Ohio.

BOOK AND WRITING CONTROVERSY

Comments of Harold Crabtree, chairman of the book and writing section of the Canadian Pulp and Paper Association, in his annual address before the convention of the association in Montreal, drew fire from the Canadian magazine and agricultural paper publishers this week. Mr. Crabtree, in his report, pointed out that the production of book and writing papers had increased 7.5 per cent during 1928 and had touched a total of 60,000 tons, of which 95 per cent was used in Canada. But he complained about the increase in importation of these classes of paper from 4,268 tons in 1927 to 6,041 tons in 1928 and attributed this increase in importations to the new item in the last Canadian tariff providing a drawback of 80 per cent of the duty on paper imported for the production of magazines or agricultural papers. A spokesman for the farm papers and magazines this week pointed out that the increased production of the paper manufacturers was in a measure directly due to the growth of the Canadian periodicals.

He pointed out that not more than 800 tons of the increased importations could possibly have been subject to the drawback and that this amount was not more than 1.33 per cent of the 1928 production of the Canadian mills. Most of the increased importation, he considered to be in the special and fancy grades of paper not made in Canada, which were in greater demand because of increased prosperity in Canada. Moreover, he pointed out, Canadian mills during the war did not show any particular desire to go after orders from Canadian publishers and finished 1928 with their machines booked to capacity. Strong objection is taken to the papermakers' statement that the "book paper industry of Canada cannot thrive without reasonable protection against overwhelming competition from overseas."

"This overwhelming competition does not exist," it was stated. "The industry is more than adequately protected. The amount of paper that is subject to the drawback clause is not more than 4,000 tons per year and the actual importations of this nature are only a fifth of that or 1.33 per cent of the total production of Canadian mills. And this 1.33 per cent will not be imported when Canadian papermakers adopt a reasonable attitude toward their Canadian buyers."

Mr, Crabtree's statement that the book paper makers were not given a fair opportunity to present their case before the tariff board is combatted. It is pointed out that the paper makers were given opportunity to present a reply to the submissions of the publishers and did not submit extensive data. The publishers, after examining the data, felt that it did not affect their original case and did not make a counter reply. Thus the paper makers had the final word.

KRAFT MILL FOR BRITISH COLUMBIA

The view is being more widely held both in Eastern and Western Canada that British Columbia will be a comparatively large factor in the pulp and paper industry of Canada, and this is strengthened by announcement of the development of a lumber, pulp and paper plant at Port Mellon, on Howe Sound, 24 miles from Vancouver. Here the Vancouver Kraft Company is planning an expenditure of $1,500,000 on a pulp and paper and lumber plant which will give special attention to the manufacture of kraft paper for use as bags and wrapping paper. Two large news print mills have been located for a number of years in British Columbia. The coming kraft development is not expected to interfere with Dryden Paper Company's developemnt, as the latter looks upon its western field mainly as covering Manitoba, Saskatchewan, and to some extent Alberta.

Not long ago it was Filters ---now it's Rod Mills

PAPER makers are ready to accept new types of machines and new process steps when convinced of their merits.

Take filters, for instance. First applied a few years back, their value is now no longer questioned as some 450 separate installed units will attest.

Today the trend is toward the use of rod mills for beating and refining.

The savings in power, the improved quality of the fibers, the advantage of continuous beating—all point definitely toward rod-mill practice as the coming method.

And Marcy *Open End* Rod Mills because of their inherent structural and operating advantages and low maintenance costs are getting the call.

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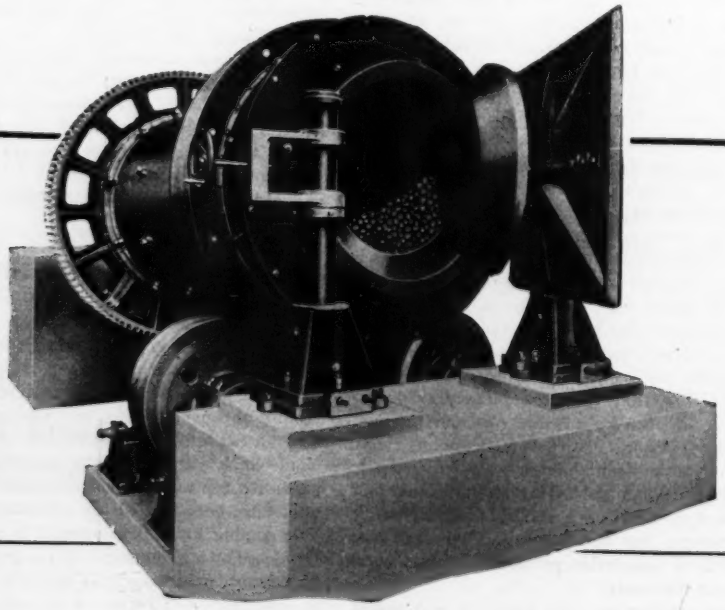

MASSCO

Wisconsin Paper Mills Make Improvements

Vast Sums Spent Last Year by Practically All the Companies in Overhauling, Enlarging and Generally Improving Their Plants to Meet the Constantly Increasing Competition—In the Power Plants Especially Opportunities for Economies Have Been Found and At Least Seven Mills Have Built New Boiler Plants During the Year and Other Mills Also Contemplate Doing So—Much New Equipment Is Being Installed.

Written Especially for the Annual Number of the Paper Trade Journal by Erik L. Madisen.

PAPER mills of Wisconsin have been making a pronounced fight during the last year against profitless prosperity. Finding prices lowered and competition more keen than it has ever been before, due to the constantly increasing number of mills, they are determined to stay in the race and therefore have spent sums running into millions to overhaul, enlarge and generally equip their plants for the struggle which seems to be gaining in force instead of diminishing.

It was evident a year ago that Wisconsin would face a situation of this kind, more especially as Canadian mills, with the pulpwood supply right at their door, have a distinct advantage over this state, where the length of the haul from forest to mill is increasing every year. It therefore has been a general policy in the industry to cut production costs to the minimum, increase production and prevent waste. Wherever it was possible to do this, the mills still could show a satisfactory profit in the face of price cutting tendencies.

Transition from unprofitable to profitable fields continues. A survey made recently showed that the tonnage in Wisconsin is increasing and that the daily output is now 2,200 tons. News print production has dropped in volume every year and there will be another decided shift soon when the Consolidated Water Power and Paper Company, of Wisconsin Rapids, changes over its mills to book paper. This company has been the largest news print producer for some time, but found Canadian competition too difficult to meet. The news print decline is made up for by the increase in tonnage of glassine and greaseproof papers, specialties, napkins, and crepe.

Improvements in Power Plants

It is in the power plants that mills seem to have found one of the biggest opportunities for economy. At least seven companies have built new boiler plants and several others are contemplating the same thing this year. It has been found that the new pulverizing system of feeding coal, with automatic stokers, is considerably more efficient, as are also the steam turbines. Equipment of the latest type therefore is replacing the old steam plants, including entirely new buildings and smokestacks.

Large sums also have been spent in improved equipment. The Rhinelander Paper Company, with a new 140-inch glassine machine and finishing mill, the Consolidated Water Power and Paper Company, with new bleaching and finishing plants and improved machinery, the Interlake Pulp and Paper Company with a new 9-digester plant, the Nekoosa-Edwards Paper Company with two millions to make theirs an exclusive kraft plant, and the Fort Howard Paper Company with a new power plant, dock and warehouse are examples of the widespread building, rebuilding and remodeling movement characteristic all over the state.

Increased Financial Strength

Increased financial strength also has been shown during the last year. A reorganization of the Kimberly-Clark Company took place, and the Kimberly-Clark Corporation was created with a combined capital in common and preferred stock and contemplated bond issues of more than fifty million dollars. The Mosinee Paper Mills Company cut its fixed charges $30,000 annually by calling in seven per cent bonds and marketing a new issue of $3,000,000. Capital stock of the Nekoosa-Edwards Paper Company was doubled by declaring a $3,000,000 stock dividend.

Only one new company was organized during the last twelve months, the Harshberger-Theilacker Company, of Milwaukee, a $275,000 concern which will manufacture roofing. Several sales and mergers took place, however. The Lakeview Paper Company of Neenah, was sold to the Mead-Abitibi interests and the defunct Peshtigo Paper Company to the Badger Paper Mills, Inc. The Bay West Paper Company, a converting plant, was sold to the Mosinee Paper Mills Company. Another merger placed the Vera Chemical Company into the eight million dollar Paper Makers Chemical Corporation. Further progress has been made with the new company organized over a year ago at Neenah known as the Wisconsin Carton Company. The personnel has been completed and a site selected for a plant. Only one receivership was reported, that of the Menasha Paper Mills Company.

Progress in Reforestation

There has been more real progress during the last year in solution of Wisconsin's problem of dwindling timber supply than for many years past. A commercial forestry conference was held early in 1928 at which a movement was started to conduct reforestation on a large scale. The purpose was to place the new severance tax law in operation. The result is a general desire to engage in tree planting, with paper mills taking the leading part. Half a million acres have been allocated by the federal government as a forest preserve in addition to what was so designated in the past. City, county and state forests are being advocated. The Nekoosa-Edwards Paper Company is replanting all of its lands with trees, and estimates that its own forests in the future will provide all the wood needed.

New methods of production gradually are coming into use through the work of the United States Forest Products Laboratory, located at Madison, Wis. The rod mill gradually is taking its place in the industry, and thirty-seven of these have been installed in the last four years, the laboratory finds. Experiments in the use of Tawa wood and hardwoods were carried on by the laboratory at the request of the New Zealand government. It was found that paper could be made successfully with Tawa and other hard woods. It is expected that these processes will be further perfected during 1929 and that they will bring about important developments in manufacture.

Safety work has spread considerably until at this time there are few paper mills in Wisconsin that have not adopted some organized method of removing hazards and cutting down accidents. The Fox River Valley mills have been the pioneer in this line, but the Wisconsin River Valley has caught the same

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spirit and is utilizing this phase of efficiency, which not only reduces accidents but improves morale and esprit de corps. Local and sectional safety mass meetings have been held. Reports in safety campaigns show commendable reductions in lost time accidents.

Educational Work

Educational work has taken rapid strides. Every paper mill city has offered courses to workers during the year in cooperation with the vocational schools. Workers have been taught more about their jobs, and about the operations of the mills, foremen have engaged in technical study, and newcomers to the industry have learned something about it. Classes in foremanship also have been held, and instruction also has been given in safety.

One incident that perhaps will become historic is the purchase of an airplane by the Nekoosa-Edwards Paper Company. The plane has been used by company officials in their travels and by the sales force so as to speed up and cover more ground. This is the first instance known in the state or in several states where a paper company has provided its own air travel.

Reorganizations

In the reorganization of the Kimberly-Clark Company referred to above, a new Delaware corporation was formed to absorb the original company and most of its subsidiaries. The official personnel remained the same, with F. J. Sensenbrenner as president. Its capitalization is 500,000 shares of common stock, $10,000,000 of 6 per cent cumulative preferred, and $20,000,000 of 5 per cent first mortgage bonds. Timber holdings and the company's interest in the Spruce Falls Power and Paper Company, Ltd., of Canada, were included in the new corporation.

The newly organized Badger Paper Mills, Inc., purchased the pulp mill and two-machine paper mill of the defunct Peshtigo Paper Company, Peshtigo, Wis., for $250,000 and will bring this industry back into line with the profitable ones. All of the incumbrances which prevented profitable operation except for tax liens, were dropped on order of the court. E. A. Meyer, former vice president and manager of the Menasha Products Company, is head of the new organization. Wax paper production will be added.

Purchasers of the Lakeview Paper Company, of Neenah, were the Abitibi Pulp and Paper Company, of Canada, and the Mead Pulp and Paper Company, of Dayton, Ohio. The mill was owned by Sears, Roebuck & Co., and was used for making catalog paper. The Abitibi and Mead interests also purchased the Thunder Bay Paper Company, of Port Arthur, Ont., from the Consolidated Water and Power Company, giving the new owners one of the fastest news print mills in existence.

Organization of the Wisconsin Carton Company proceeded to the point where B. C. Koepke, prominent contractor of Appleton, Wis., was elected president. Capital stock is being sold at the present time so a plant can be built on land where the Valley Paper Mills started to put up a mill several years ago. The company is capitalized for $200,000.

The Harshberger-Theilacker Company was organized by Norman P. Harshberger, owner of a number of roofing formulas and design patents, and Frederick E. Theilacker. A plant is to be established at once with the aid of the Milwaukee Association of Commerce. Capitalization of the company is $275,000.

Rosin size for paper mills was produced by the Vera Chemical Company, which was merged with the Paper Makers Chemical Corporation. The former was capitalized at $500,000 and now is part of a concern with a capital of $8,000,000. Practically no changes were made by the merger of the Bay West Paper Company, of Green Bay, Wis., with the Mosinee Paper Mills Company, of Mosinee. The purpose was to bring into direct control of the Mosinee company the converting plant which was using most of its kraft output. Frank P. Vaughan remains as general manager.

Some of the larger bond issues floated during the year were those of the Nekoosa-Edwards Paper Company, $3,500,000, Northern Electric Company, a subsidiary of the Northern Paper Mills, $4,000,000, Mosinee Paper Mills Company, $1,700,000, and Green Bay and Mississippi Canal Company, $1,250,000. In each of these cases except that of the Northern Electric Company, the companies took advantage of lower interest rates, recalled issues at high rates, and marketed securities at lower rates.

Meeting Changing Conditions

Mills everywhere have shown a desire to keep abreast of the times, not only to have modern plants but to meet the changing conditions. The Rhinelander Paper Company installed a 140-inch Beloit machine with removable Fourdrinier and has become the second largest glassine mill in the country, and the only one of this size, it is said, which makes its own sulphite. A two story finishing room was built as well as an entirely new boiler room. New Babcock & Wilcox Stirling boilers were installed, equipped with Taylor stokers, and a 4,000 K. W. high pressure steam turbine was added. The company also put up a new office building so as to have more centralized mill control.

At the Wausau Paper Mills Company, Brokaw, Wis., a new boiler house and hydro-electric station were built. The improvements included a new water wheel, two boilers of 512 hp. and the latest type of auxiliary equipment.

One of the largest digester plants of its kind was completed and has just been put into operation by the Interlake Pulp and Paper Company, Appleton, a subsidiary of the Consolidated Water Power and Paper Company. The building is 61 by 180 feet, and 95 feet high. Nine digesters were installed and the plant has a capacity of ninety tons of Mitscherlich sulphite pulp. The cost was approximately $450,000.

Two large new mill units were built during the year at the main mill of the Consolidated Water Power and Paper Company, Wisconsin Rapids. These were a new finishing room three stories high, and 98 by 176 feet in size, and a new bleaching and clay preparation plant of two stories, 72 by 114 feet in size. Their construction was caused by a decision of the company to change the mill over from news print to book paper. Changes also have been made in the machinery for this reason. A 134-inch super calender has been installed and is equipped with a Cameron rewinder. The two original paper machines were rebuilt and their sheet width changed to 127-inch trim. Barking drums at the mill at Biron have been replaced and new motors installed on the pulp grinders there.

At the Fort Howard Paper Company, Green Bay, a four fold improvement program has been in progress. A new dock was built on the Fox river so coal could be brought by boat to the mill, and a warehouse was erected, providing 33,000 feet of additional floor space. A new power plant in a building 50 by 80 feet has been completed, and the fourth step in the program is the installation of "save all" machinery costing about $15,000. The whole program amounted to about $175,000.

In the $2,000,000 improvement program of the Nekoosa-Edwards Paper Company, of Port Edwards and Nekoosa, a kraft bleach plant has been started at a cost of $150,000, enabling the company to produce bleached kraft for the first time. A new boiler plant is to be built at a cost of $200,000, providing the latest in steam power equipment for the Port Edwards mill. Later the boiler plant at the Nekoosa mill will be rebuilt. Two sulphite digesters at the Nekoosa plant have been removed and three new five ton kraft digesters put in their place. The mill now has five kraft digesters with a capacity of 200 tons. Remodeling of the four paper machines at Nekoosa has been undertaken at a cost of $300,000, so they can operate at high speed on kraft paper, with a maximum production of 180 tons daily. Further installations include a rod mill at Nekoosa for sulphate stock, doing away largely with beaters and jordans, and the construction of a new wet machine room 90 by 175 feet at a cost of $312,000.

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THE ALBEMARLE PAPER MANUFACTURING COMPANY
Richmond, Virginia

A three story building 112 by 299 feet was built by the Northern Paper Mills, Green Bay, to house a new converting department and two floors for storage. Now the company is to substitute a 175½-inch machine for Nos. 1 and 5, thus causing a production of 50 tons daily. The machine room is to be enlarged by enclosing a court.

Completion of a new ground wood mill was effected by the Kimberly-Clark Company at its mill at Kimberly. P. A. Paulson drum barkers were installed, giving an output of 80 tons of wood daily. The Falls Manufacturing Company, Oconto Falls, has constructed a new beater room, and has enlarged the digester and diffuser room. A new beater and three large diffusers were installed and the mill capacity increased by one-third. The Appleton Machine Company, Appleton, has erected a new foundry building costing about $90,000. At the Menasha Products Company, Menasha, a one story building was put up for a waxing department, and $75,000 factory unit of two stories was built to accommodate additional presses. The company added one four color wrapper press which prints a sheet 84 inches wide at the rate of 48,000 feet an hour.

The Bergstrom Paper Company, Neenah, Wis., completed a new boiler house costing about $90,000, and installed new boilers, stokers and turbines. A second paper machine was installed at the DePere Paper Manufacturing Company, DePere, about doubling the former capacity of 40,000 pounds of wrapping paper daily. The Flambeau Paper Company, Park Falls, Wis., completely overhauled machine No. 1 so as to increase production to 250 feet a minute. The Fox River Paper Company, Appleton, erected a new boiler plant and installed four new boilers and a 200 hp. generator. A similar improvement is in progress at the John Strange Paper Company, Menasha.

Increased production made it necessary for the Appleton Coated Paper Company, Appleton, to build a new finishing room 240 by 105 feet at a cost of about $125,000. A new plant addition costing $50,000 was contemplated by the Hummel & Downing Company, box manufacturers, Milwaukee. Contemplated improvements are a new power plant for the Patten Paper Company, Ltd., Appleton, and additional box making machinery for the Ahdawagam Products Company, Wisconsin Rapids.

Among the water power improvements was the rebuilding of the large dam on the Fox river at DePere. The sluiceway section is 350 feet long, and is completely replaced. The Chippewa Falls plant of the Northern States Power Company was put into operation, giving the company a total of 100,000 hp.

Experiments at Madison

In the experiments completed with New Zealand woods by the United States Forest Products Laboratory at Madison, news print was produced from mixtures of tawa ground wood and tawa sulphite, with insignis pine. Kraft pulps were produced from New Zealand pines and larch, and bleached pulps from tawa. News print was made at the Consolidated Water Power and Paper Company and the Great Western Paper Company with good success. Further experiments in diversification of woods are being carried on.

Ten rod mills were in use on kraft paper, the laboratory at Madison found in its survey, and five on sulphite pulp or screenings. Thirteen others were in use on semi-chemical pulps. It is believed that many more of these will be put into operation soon.

An effective de-inking process for news print was claimed by William Hamilton, of Ashland, Wis., several months ago. He used a secret formula which made the process possible at a negligible cost.

Lake States Forestry District

Wisconsin was made the headquarters of the Lake States Forestry District of the federal government, and has placed Earl F. Tinker in charge. Minnesota is included in the district and Indiana, South Dakota and Ohio will be added later. There has been appropriated $6,000,000 for forestry work, largely that of acquiring lands for federal reserves, and for reforestation. Three national preserves have been approved in Wisconsin, with a total of 428,580 acres.

All of the cutover lands owned by the Nekoosa-Edwards Paper Company in Ashland and Sawyer counties will be planted with trees suitable for pulpwood. The company's nursery has nearly 2,000,000 trees and the plantings will amount to about 2,500 acres a year. About 4,000,000 trees will be growing and cutting will start in about 40 years. The Tomahawk Kraft Paper Company planted about 100,000 trees last fall and expects to have 20,000 acres growing. An additional 162,000 acres in the state were set aside for tree growing by private owners, under the new severance tax law. The owner pays an annual tax of 10 cents an acre, and the state pays a like amount. Then when the timber is cut, a tax is paid on the market value. It is estimated that 20,000,000 trees will be available in the nurseries in five years. Paper mills have 31,360 acres reserved for reforestation under the severance tax law.

This awakened situation comes about largely because of a commercial forestry conference held early in 1928. Executives and influential persons from all over the state attended the session, learned the truth about the disappearance of the forests, and learned also how Wisconsin's new laws operated. The result was a "forest-minded" attitude on the part of the public. D. C. Everest, general manager of the Marathon Paper Mills Company, Rothschild, was the chairman and one of the leaders in fostering this movement.

During the last summer, extensive fire fighting apparatus was provided in the northern wooded areas so as to prevent further devastation by fires, the chief source of loss in timber regions. The number of forest wardens was increased, and lookout towers were built. Telephone lines also have been strung between lookout stations for quick warning of fires.

Legislation also is pending which will enable local units of government to utilize for forestry lands which were seized because of delinquent taxes. Larger appropriations also are asked for conservation work.

Safety Conditions Improving

Safety conditions constantly are improving. The Kimberly-Clark Corporation offers rewards of five dollars per employee in each department that achieves one hundred "man years" of safety, and has been called upon several times during the year to pay this amount.

Safety schools have been well attended. At Menasha there was an enrollment of nearly 500; at Wausau, 300; at Rhinelander, 60; at Appleton 275, and a like response in other cities.

The Fox River Valley Safety Council, the pioneer and the outstanding unit in safety work, has been reorganized. Now there is a local unit in each city under the council's administration, and each such unit conducts safety work not only in industries but in the community as well. There was an attendance of over 1,500 at the annual valley safety conference last year at Oshkosh.

Vocational Education

Likewise there have been rapid strides in the educational program undertaken jointly by the paper mills and the vocational schools. Evening schools still are operated in some cities, but during the last season most of the mills have had classes conducted right at the plants. Paper and pulp making, foremanship and safety have been taught to large numbers. This program started at Appleton and spread throughout the Fox River Valley. The idea then was investigated by the state board for vocational education, and was extended to all paper making centers. The result is that the program has been statewide, with H. G. Noyes in charge. A better fundamental knowledge of the industry and a better understanding of problems are among the results. Workers become more efficient, more interested, and more anxious for improvement of their status.

PAPER TRADE JOURNAL
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THE YEAR IN PAPER

The resumes presented elsewhere in this Annual Review and Convention Number of the PAPER TRADE JOURNAL furnish an interesting cross section of the pulp and paper industry for the past year. These reviews include all the representative markets and were, as usual, prepared by thoroughly experienced men who understand what they are talking about and who have not hesitated to picture conditions just as they exist. The articles in some cases do not make pleasant reading, but they are presented with the hope that they may have some influence, at least, in bringing about a betterment in certain conditions that cannot be remedied any too soon for the general welfare of the paper business.

The annual reviews indicate that while not greatly satisfactory from the viewpoint of profits, the paper industry experienced another exceedingly busy year during 1928. In news print 4,044,000 tons were produced on the North American continent in 1928 as compared with 3,789,000 tons in 1927. To this increase Canada contributed nearly 300,000 tons and the remainder of the increase was contributed by Newfoundland and Mexico. The production in the United States was only 1,415,000 tons which was 70,000 tons less than the preceding year and the smallest quantity produced since 1921. The surprising total contributed by Canada is, of course, largely accounted for by the coming into production of three great new mills and the addition of new machinery to plants already in existence.

The securing of markets for this enormous increase resulted in some price manipulation which has had rather serious consequences and which might have resulted more disastrously except for the interference of the Provincial Governments. Because of this situation, the contract price, usually announced in the early fall, was long delayed and, in fact, has not yet been completely determined upon at this writing. It now seems probable, however, that there will be a reduction of about ten dollars per ton from last year's price.

It is evident that much intelligence must continue to be exercised to keep matters in the news print section of the market on an even keel because it is estimated on reliable authority that the additional tonnage scheduled to come on the market from the new machines to be started in Canada during the first half of 1929 is in excess of 500 tons. But while this section of the industry faces unusually perplexing conditions, it is good to know that representative news print men are hopeful that these conditions will be successfully overcome as time goes along.

Book paper experienced another active year. Five new machines, however, were installed during 1928 with a capacity of 230 tons and this abnormal increase had a tendency to prevent price stabilization. Prices were lowered about three dollars per ton early in the year and about the same amount in the summer. While it is not definitely known, of course, how many new machines will be added during the current year, the most trustworthy opinion is that the increase will not be quite as great as in the years since 1925, when a total of thirty-eight new Fourdriniers with a productive capacity of 1,285 tons were added. If there are comparatively few installations during the year, as seems likely, there is reason to hope for some improvement in the book section of the market.

Fine papers experienced a fairly satisfactory year. The market paralleled that of the preceding year in most particulars. The market at the beginning of the year opened actively, experienced the usual quietitude in the summer and recovered quite satisfactorily in the fall, the recovery being more especially marked in the higher grades of paper. The recovery in general, however, was sufficient to bring the total sales in most varieties slightly above the level of 1927. The volume in writing paper, for instance, was about three per cent in excess of 1927 and sales of tissue also were about three per cent higher than the preceding year. Cover paper, however, showed a decline of about five per cent for the year, which decline is probably due to the increasing use of heavy book paper for advertising covers. A noteworthy feature of the market was the splendid adjustment of production to demand throughout the year. Increase in advertising and in sales promotional work helped to obliterate in this branch of the industry some of the difficulties encountered by some of the other branches of the paper business.

Wrapping paper experienced another unsatisfactory year. The influences that complicated the situation in this department of the market of late years continued with little change and in addition, there was the normal annual increase in production. Although running at an estimated capacity of only about 80 per cent during the year, the wrapping paper mills were able not only to supply the demand, but have accumulated stocks. The problem here, as in some other divisions of the market, is obviously not a manufacturing one, but one of distribution. More attention to this department of the business, it is believed, will help very considerably in effecting a long needed improvement.

The paper board section of the market experienced a disappointing year. While the mills in this section of the industry were operated more efficiently than usual, the sales policy in determining prices during the year was an outstanding failure. Competition throughout the year was based largely on a desire for volume with price a secondary consideration. Although the market had been declining more or less throughout the year, some of the representative mills in the late fall announced a reduction of ten dollars per ton on some varieties of board. As contracts are made in January, and some of these have from three to six months to run, a considerable back-log of business at ex-

tremely low prices will have to be worked out of the way before much of an improvement in prices can be effected. While the year just closed, however, has been a disappointment, this section of the market as a whole is disposed to hope that the worst has been experienced and that changes during the year will be in the nature of an improvement.

The reviews as a whole, obviously, are not inspiring. However, there is no reason for paper men to be greatly discouraged at the outlook. The reason for the unsatisfactory year is primarily lack of intelligent merchandising. Basic conditions in the industry are sound. The mills never have been as efficiently equipped as at present, nor has the consuming demand for paper been greater. General business conditions are good with the prospects strong that the prosperity that has been prevalent for a number of years past will continue. It must be remembered, however, that paper must be sold at reasonable prices in order to insure a profit. There will be an improvement in merchandising methods in most varieties of paper, if the experience of the past year has taught the lesson it should, and if there is, the year should be a fairly prosperous one for the paper industry in general.

THE NEWS PRINT CRISIS

Politicians in Canada who have been trying to make capital out of the news print crisis have been less conspicuous during the past week, and, like investors in news print enterprises, have apparently adopted a policy of watchful waiting. If the price situation is straightened out satisfactorily, and if the redistribution of orders pro rata to capacity does not cause unemployment in districts where certain mills have hitherto been running to capacity, then the political aspects of the question may disappear, but there is no use blinking the fact that a highly delicate situation still obtains, and that news print executives will have to step warily for a long time to come.

Nothing new in regard to prices for the current year has been announced. At the annual meeting of the Donnacona Company, Lt.-Col. John H. Price reiterated the assurance frequently given by stating that he was convinced that the negotiations now in progress will result in stabilization of prices and gradual improvement in the general situation of the news print manufacturers. This would seem to indicate that no discordant factor has arisen in the further conferences which have taken place in Montreal during the week among news print executives. Some of the papers also are quoting a statement alleged to have been givn by N. C. Head, assistant to H. R. Graustein, president of the International Paper Company, namely that "If you say around $55 a ton at the mill you will not be very far wrong."

Meanwhile production of news print shows what would be a gratifying increase were it not for the fact that capacity has been increasing so rapidly. For instance in the month of January there was an increased production of 13 per cent over that in the similar month last year, but mills operated at 81.9 per cent of capacity.

UNION BAG SHIPS PULP FROM COAST

The steamer Lillian Luckenbach, clearing from the harbor at Tacoma, Wash., February 9, carried 1,000 tons of paper pulp, the first water-borne shipment from the plant of the Union Bag and Paper Power Corporation and the first large consignment to be sent from Tacoma since the two tide-flats pulp mills began to operate the first of the year. This pulp consignment goes to the plant of the Union Bag and Paper Corporation at Hudson Falls.

Two weeks ago the Edgar Luckenbach was in port and loaded several hundred tons of pulp at the Shaffer terminal. Both of these pulp companies had previously shipped by rail to New York. The Shaffer Company will be loading another shipment for Eastern markets very shortly, it is said.

PULPWOOD PROTECTION BILL INTRODUCED

Since the Dominion Government has failed to exercise its power to cut down the export of Canadian pulpwood to United States paper mills, the Ontario Government, which has objected consistently to the Ottawa policy is equipping itself with a lever by which it may regulate the flow across the border. This lever is the proposed Pulpwood Conservation Act, section six of which Act gives the Minister of Lands and Forests power to "direct and control the location, sequence or extent of cuttings and to limit the cutting from year to year, by any company, for the purpose of conserving the source of supply and placing Ontario on a sustained yield basis."

Under the bill, which was introduced in the Ontario Legislature at Toronto this week, the department could force a company which was exporting too much pulpwood to buy a greater portion of its supply from settlers and farmers. The latter have the right to take a certain quantity of pulpwood from their land annually. "We shall say to the company," said the Minister, "'We won't allow you to cut on your own land unless you take so much pulpwood from the settlers.' If they are exporting too much pulpwood, we can in this way say to them, 'In future you will have to buy your wood.' Of course no one is concerned about the export of 25,000 or 50,000 cords of wood. But to think of the hundreds of thousands of tons of spruce going out of Ontario—not to speak of Quebec—that is entirely wrong. I think it is going to be an effective remedy. It is going to give us the right to cut down that enormous quantity of pulpwood."

Some startling figures touching the news print industry of Canada were given by the Minister in introducing the bill. Last year, he stated, Canada produced about 10,000 tons daily, to 6,000 tons in the United States. In 1923, value of the Dominion's production was $188,000,000; in 1924, $187,000,000; in 1925, $202,000,000; in 1926, $224,000,000; in 1927, $231,000,000, and in 1928, approximately, $235,000,000. In 1928 Canada produced 2,381,000 tons of news print, to the United States 1,415,000 tons. In 1913, Canada produced only 350,000 tons to the United States 1,305,000. Canada trailed the United States in production until 1926, although in 1925 she fell only 8,000 tons short of the States production of 1,503,000 tons. In 1926 she produced 1,882,000 tons, to the States 1,686,000, and again in 1927, she increased her advantage by producing 2,087,000 tons to the States 1,485,000. Ninety per cent of Canada's production is exported, 82 per cent of the production, as a matter of fact going to the United States.

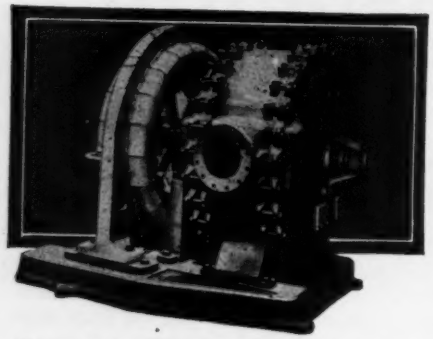
PEAT PRODUCTS CO.'S PLANS

Whether wall board, cartons, roofing and other products may be made successfully from peat will be tested this spring by the Peat Products Company, a corporation which will probably be located at Portage, Wis. Preliminary plans of the company were announced some time ago and development steps have been in progress since last summer. The company first was known as the Roth-Grahn Company, but the name has been changed as above. The capital stock is to be $300,000, of which $100,000 is preferred and $200,000 is common. As now incorporated, the concern will manufacture wall board, roofing paper, cartons and butter tubs. It is said that contracts already have been signed for part of the output and machinery has been purchased.

Officials have been looking over Portage as a suitable site on which to build a plant, because of its proximity to peat bogs. An option has been obtained on 1,000 acres of these lands as the source of raw materials. If possible the plant will be completed this spring and operations will be started with about fifty men.

It is stated that the company has devised a process for treating peat so that it may be worked up into a fibrous pulp and pressed into a very durable type of board. Officers of the concern are: William Grahn, of Westfield, Wis., president; O. E. Huebner, Portage, Wis., vice president, and W. L. Wolfert, of Oxford, Wis., secretary. C. F. Mahnke is the assistant secretary and is looking after the plant arrangements.

In these mills—and in 600 others

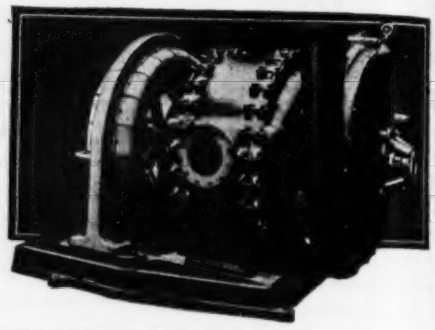


Nash Hytor Vacuum Pump. For flat boxes, wires, felts, and suction rolls. Capacities up to and exceeding 5,000 cu. ft. of air per min.

Nash Hytor Vacuum Pumps and Jennings Flat Box Pumps are preferred by leading manufacturers of pulp and paper in this country and Canada. This preference is again affirmed by the following partial list of recent installations.

Abitibi Power & Paper Co., Iroquois Falls, Ont.
7 Hytor Vacuum Pumps
Advance Bag & Paper Co., Advance, La.
3 Hytor Vacuum Pumps
Anglo-Canadian Pulp & Paper Co., Limoilou, Que.
8 Hytor Vacuum Pumps—4 Jennings Flat Box Pumps
Fort William Paper Co., Fort William, Ont.
1 Hytor Vacuum Pump
Fraser Papers, Ltd., Madawaska, Me.
6 Hytor Vacuum Pumps
Mead Fibre Co., Kingsport, Tenn.
2 Hytor Vacuum Pumps
Spanish River Pulp & Paper Co. Sturgeon Falls, Ont.
2 Hytor Vacuum Pumps
Spruce Falls Power & Paper Co., Kapuskasing, Ont.
4 Jennings Flat Box Pumps
Taggart Oswego Co., Oswego, N. Y.
3 Hytor Vacuum Pumps. 1 Jennings Flat Box Pump
Thunder Bay Paper Co., Port Arthur, Ont.
10 Hytor Vacuum Pumps
Washington Pulp & Paper Co., Port Angeles, Wash.
2 Hytor Vacuum Pumps

Mills in which Nash equipment is installed number over 600 and make more than 81% of the total production of paper in the United States and Canada. Write for complete details.



JENNINGS FLAT BOX PUMP. Capacities from 150 to 5000 g.p.m. of water together with 80 to 2300 cubic ft. of air per min.

Jennings Pumps

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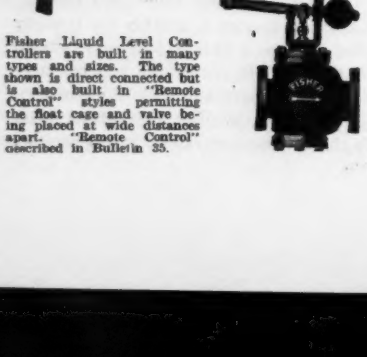
Control Liquid Levels Automatically

Fisher Automatic Liquid Level Controller—Type No. 227-A—is a sensitive device for holding a pre-determined level of liquid in any container or pipe where an external float is required. It is applied to all equipment where baffle plates, condenser tubing, internal piping, and other obstructions prevent the placing of a float inside the vessel holding the liquid, also where surging would prevent the accurate operation of inside float valve.

The float cage is installed on the exterior of the tank by means of equalizing pipes. The level maintained in equalizing pipes, as equal to the level in the tank, causes the float ball to rise or drop thus transmitting the necessary opening and closing action by means of connecting levers to the flow control valve.

Important details covering this device are contained in Bulletin 31. Write for a copy.



Fisher Liquid Level Controllers are built in many types and sizes. The type shown is direct connected but is also built in "Remote Control" styles permitting the float cage and valve being placed at wide distances apart. "Remote Control" described in Bulletin 35.

FISHER

FISHER—since 1880—has specialized in the manufacture of sensitive control, automatic regulating specialties—they are today's foremost builder—they have advanced the efficiency of their products, each year, in keeping with the trend of progress. They have materially aided industry to reach its present day high standard of economical mass production.

Whenever it comes to handling liquids—keeping them under perfect level control—under all operating and climatic conditions—in such equipment as storage or closed tanks, towers, receivers, pipe lines, heaters, condensers, etc.—most engineers put their problem up to Fisher. And—rightly so! Fisher is the outstanding manufacturer of external liquid level controllers. Their use is so widespread and so well recognized that modern power plant methods demand their installation.

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Ask For More Adequate Protection on Paper

D. C. Everest, President of the American Paper and Pulp Association, Presents General Case for the Industry Before the Ways and Means Committee of the House of Representatives at Washington—Other Representative Paper Men at the Hearings

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 18, 1929.—The paper industry of the United States as represented by the American Paper and Pulp Association, through its various groups, appeared before the Ways and Means Committee of the House of Representatives on February 13 and 14 and made one of the finest showings during the present tariff hearings.

D. C. Everest Presents Case

The presentation of the industry in general was first made by D. C. Everest, of Rothschild, Wis., president of the association who pointed out, among other things, that while there are some 74 different items in the paper schedule in which the association is interested, increases in rates were being asked in but 21 of these Mr. Everest was followed on the stand by members of the tariff committees of the various groups. Mr. Everest in his opening statement said:

This brief is presented by the American Paper and Pulp Association on behalf of the paper industry of the United States. The American Paper and Pulp Association is the industry's central national association, representing fully 80 per cent of the total tonnage of paper and pulp manufactured in the United States. Its purpose is to enable the industry to act as a unit for its protection, promotion and perpetuation with respect to major problems of general import to all branches of the industry.

This brief has been prepared after conference with members and non-members of the Association.

Ranks Seventh Among Great Industries

This industry is one of the oldest in America, and from a small beginning its development has been such that today, with the closely allied interests of printing, publishing, etc., it ranks seventh among the great industries of the nation.

This is a fundamental industry with an annual production in excess of 10,000,000 tons, valued at upwards of $1,000,000,000.00.

Its importance has been recognized by the Congress from the beginning of our government. The second statute passed by Congress on July 4, 1789, one of the purposes of which was the "protection of manufactures" provided for an ad valorem duty of 7½ per cent upon "all writing, printing or wrapping paper, paper hangings and pasteboard." In each succeeding tariff act the Congress has recognized the growth and importance of the industry and the necessity for according it protection.

When the first statute was passed in 1789, there were but a few small mills making hand made paper, scattered along the North Atlantic seaboard. Today there is in excess of 1,000 plants in 36 States and it has an invested capital of approximately $1,000,000,000. Not only are its products necessities to every industry and to every man, woman and child in the United States, but its employees, numbering approximately 135,000, a large portion of which are skilled workmen, in pulp and paper mills alone, and their half million or more dependents, are entirely dependent upon its welfare and prosperity.

The growth of the country and the ever increasing needs and demands for paper and paper products, have been met by the American paper manufacturers, though at times many of the branches or groups in the industry have been faced with almost ruinous foreign competition.

Industry Developing Abroad

While the industry has been developing in the United States during the past century, it is equally true that it has been developing in other parts of the world, and the American manufacturer is now faced with competition from Europe and other countries, which, in view of the cost of foreign labor and materials, cannot be met unless a substantial and adequate protection is maintained.

The total value of imports of dutiable paper and paper products is given for 1927, as about $18,000,000. This, we believe to be too low, owing to the custom of importers of classifying as *free*, papers which are in fact dutiable. While this amount may not seem to bulk large as compared with the output of the industry, we call attention to the well recognized fact that, in many lines, a comparatively small quantity of an article can "make the market" for an industry's entire production. This is especially true with respect to paper.

$131,000,000 Worth of Paper Entered Free

We also respectfully call your attention to the fact that during 1928 imports of a value of $131,000,000 were entered free of duty.

It was no doubt the intention of the Congress, by the enactment of the Tariff Act of 1922, to grant to this industry such protection as would enable it to meet foreign competition. Since the passage of that act there has been a great development in the industry along the line of new products and of using new materials for the manufacture of paper. The utilization of new species of wood and wood waste not suitable for lumber, thus enabling us to extend our forest resources, has been the outstanding accomplishment of the last few years. It has encouraged the expansion of the industry in the south and west and has given employment to thousands of persons directly and indirectly, and such development has been predicated on the protection afforded this industry.

Study of Waste Materials

Private enterprise and governmental agencies have been engaged in an intensive study of the use of waste agricultural products for manufacture into paper and kindred products. Progress has been made and in Illinois a commercial unit has been built for the manufacture of pulp from corn stalks. Paper has been produced from this product but without adequate tariff protection of the grades into which this product enters, we cannot reasonably expect the continuation of the utilization of such products or further studies and expenditures along waste utilization.

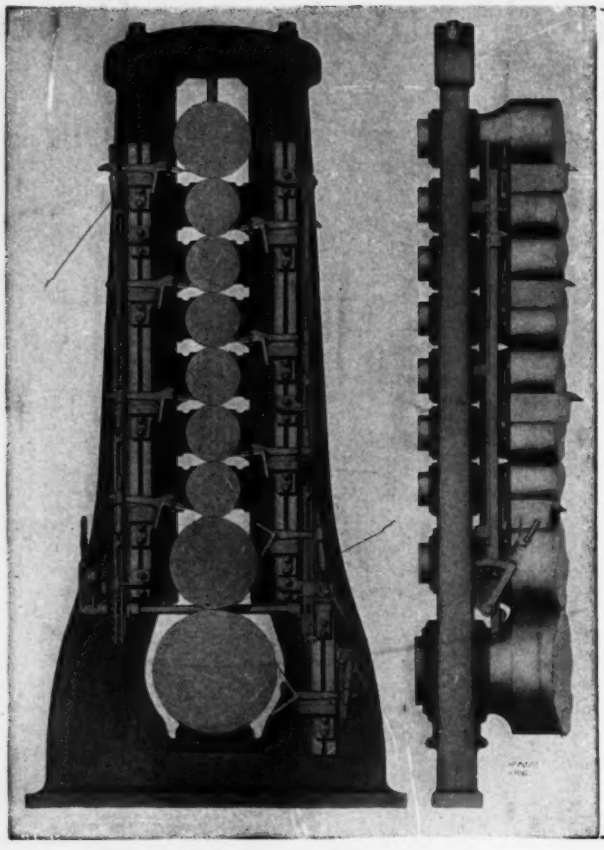
It may be proper to point out that the protection and whatever changes in rates are herein requested, are based upon the assumption that the rates of duty upon raw materials will remain as at present. If the rates on raw materials are revised, it will obviously be necessary to revise the rates herein suggested with respect to finished products.

Some four and one-half years ago this industry organized what is known as the Import Committee of the American Paper Industry. That organization employs a staff of skilled experts. One of its functions has been cooperating with the Government in securing the proper enforcement of the Tariff Act. It has investigated and digested during its existence nearly 4,000 cases in which there was reason to suspect under-valuation, misclassification, or dumping of foreign paper.

Changes Vitally Necessary

This study shows that various changes in both rates and phraseology are vitally necessary if the American manufacturer is to be given an equal chance in the American market with the foreign producer. The present act is indefinite in many of its classifications of paper.

This brief is presented with the hope and expectation of a clarification of tariff schedules. Since 1922 there have been developed, both at home and abroad, many new grades of paper



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The Doctors can be operated into or off working position by limited rocking motion controlled by hand lever which locks all Doctors by latching into adjustable quadrant. The pressure applied on Doctors is evenly distributed over every inch of every Doctor by means of universal connection of Doctors with adjustable quadrant and hand lever, the Doctor being properly balanced so as to assure easy operation. The flexible blades conform to the rolls giving perfect doctoring effect with minimum pressure. Doctors may be operated on continuously without scoring or injuring the polished surface of the rolls. Individual Doctors may be unlatched and rocked away from the rolls for cleansing purposes without interfering with universal control of other Doctors. Doctors are constructed of steels, light and strong, and may be fitted to any type of paper machine calender.

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S & K BAROMETRIC MULTI-JET CONDENSERS

operate without air pumps

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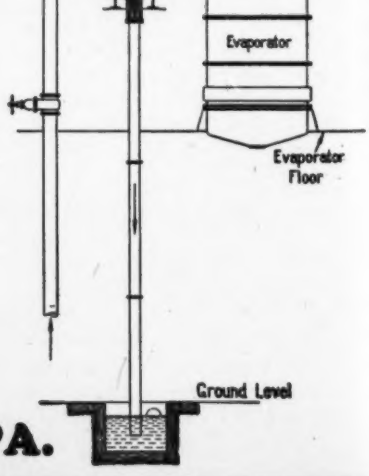
30 std. sizes—Vapor inlets 12 in. to 66 in.

Numerous successful installations in large paper mills and other plants.

Bulletin 5-AA gives complete information



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for specific uses, which were not definitely covered by previous tariff schedules. Changes have taken place in the cost of production of other grades and the proposed schedule, presented herewith, has been developed after careful consideration of all factors entering into our domestic situation. It is one of clarification and re-adjustment to meet present day needs.

In the briefs and suggested paragraphs, this Industry has not asked for a single increase in rate, except where absolutely necessary to protect the domestic producer against low foreign cost papers.

Protection Greatly Needed

The protection which we have sought herein is needed now by every branch and group in the Industry—we have also had in mind reframing this Schedule, a future protection which will enable the Industry to grow and expand and be able to meet the ever increasing demand for its products.

It will be noted that the briefs do not cover every paragraph in Schedule 13, nor all products covered by the Schedule into which paper or pulp may be converted. In thus limiting this presentation, we wish it to be understood that we do not thereby oppose proper changes in rates or in classification as to other papers or related products not covered by briefs presented herewith, and as to which briefs or other presentations may be made by individual manufacturers or groups of manufacturers. This Industry believes in proper protection for all industry. (We suggest, however, if changes are made as to products covered by this Schedule, other than those mentioned herein, due weight should be given to all rates and classifications herein requested,—in so far as such other changes might tend to increase costs in this industry.)

No Request for General Revision

In closing I desire to call to the particular attention of this committee that the paper industry is not making a request for a general revision upwards of all of the items mentioned in the various paragraphs of Schedule 13, in which it is interested.

A carefully prepared tabulation discloses that there are some 74 major items covering innumerable grades in the various paragraphs, in this Schedule referred to in the brief field by this Association.

With respect to 53 of these items, no change in rate is asked —in other words—this industry is asking for a change in rate in only 21 items. These changes are sought only with respect to items where changes in the Industry have indicated that the existing rates are no longer adequate—these instances are due almost entirely to the development of new types of paper, many of which were unknown in 1922.

An examination of the brief and the suggested substitutes for present paragraphs submitted therewith, will disclose that our chief purpose in this presentation is to so clarify the existing law that it cannot be evaded by those who, taking advantage of existing discrepancies therein, are endeavoring not only to compete unfairly with the domestic industry, but to deprive the Government of substantial sums in the way of revenue.

Misclassification Rampant

Misclassification under the existing law is rampant. There are literally hundreds of instances where entry of the foreign paper is sought under paragraphs or clauses of paragraphs relating to classes and qualities entirely different. In the preparation of the briefs it has been our purpose to present the facts which we believe justify the few changes in rates requested.

I have here a complete tabulation of the various items in Schedule 13, set off by paragraphs, in which this Industry is interested. This tabulation gives the name and description of the article, the present rates of duty, and in another column the additional rates requested. It also indicates those instances in which no advance or change in rate is asked

I respectfully ask that I may be permitted to file it with the committee at this time and have it appear in the printed record at the end of my remarks.

We have representatives from the various divisions present who are prepared to present to you briefly the proposed changes as recommended by their divisions, and we ask to be accorded the protection sought herein, which is necessary for the continued existence and prosperity of this vitally important industry.

The tabulation which Mr. Everest referred to and which shows at a glance what the industry is asking of Congress is as follows:

TABULATION SHOWING PROPOSED CHANGES IN RATES

Article	Present rate	Proposed rate	Additional duty requested
	—Par. 1301—		
Book—uncoated	¼c lb. & 10%	¼c lb. & 15%	5%
Printing—uncoated	¼c lb. & 10%	¼c lb. & 15%	5%
Rag printing—uncoated	¼c lb. & 10%	3c lb. & 15%	2¾c lb. & 5%
	—Par. 1302—		
Cardboard—unprocessed	10%	No change	None
Paper board—unprocessed	10%	No change	None
Pulp board—unprocessed	10%	No change	None
Leather board—unprocessed	10%	No change	None
Pulp board with over 50% of new pulp	10%	½c lb. & 10%	½c lb.
Sheathing paper	10%	No change	None
Roofing paper	10%	No change	None
Deadening felt	10%	No change	None
Sheathing felt	10%	No change	None
Roofing felt or felt roofing	10%	No change	None
	—Par. 1303—		
Manufactures of pulp	25%	30%	5%
	—Par. 1304—		
Tissue paper, stereotype paper, india and bible paper, condenser paper, carbon paper, bibulous paper, pottery paper, tissue paper for waxing	6c lb. & 15%	8c lb. & 20%	2c lb. & 5%
	6c lb. & 15%	6c lb. & 20%	5%
	5c lb. & 15%	5c lb. & 20%	5%
India bible paper—10 to 18 lbs. per ream	4c lb. & 15%	4c lb. & 20%	5%
Crepe paper	6c lb. & 15%	No change	None
	—Par. 1305—		
Surface coated paper for printing	5c lb. & 15%	No change	None
Surface coated paper n.s.p.f.	5c lb. & 15%	6c lb. & 15%	1c lb.
Surface coated paper embossed, etc.	5c lb. & 15%	8c lb. & 25%	3c lb. & 10%
Uncoated paper with design not printed, etc.			
Over 15 lbs. per ream	4½c lb.	8c lb.	3½c lb.
15 lbs. and under per ream	4½c lb.	10c lb.	5½c lb.
Uncoated paper with design printed, etc.			
Over 15 lbs. per ream	4½c lb. & 17%	8c lb. & 35%	3½c lb. & 18%
15 lbs. per ream and under	4½c lb. & 17%	10c lb. & 35%	5½c lb. & 18%
Metal coated paper under 15 lbs. per ream	5c lb. & 17%	10c lb. & 35%	5c lb. & 18%
Gummed paper, including simplex decalcomania paper not printed	5c lb.	5c lb. & 15%	15%
Cloth lined and reinforced paper	5c lb. & 17%	6c lb. & 25%	1c lb. & 8%
Paraffin coated paper	3c lb. & 15%	No change	None
Vegetable parchment paper	3c lb. & 15%	4c lb. & 20%	1c lb. & 5%
Greaseproof and imit. parchment, supercalendered	3c lb. & 15%	No change	None
Greaseproof and imit. parchment, all other	3c lb. & 15%	No change	None
Manufactures of foregoing paper in this paragraph	5c lb. & 20%	10c lb. & 35%	5c lb. & 15%
Plain basic photo paper	3c lb. & 15%	No change	None
Coated photographic papers	3c lb. & 20%	No change	None
Sensitized photographic papers	3c lb. & 20%	No change	None
Litho imprints on wet transfer paper	65%	No change	None
	—Par. 1307—		
Writing, letter, and note, plain	3c lb. & 15%	No change	None
Drawing, plain	3c lb. & 15%	No change	None
Hand made paper, plain	3c lb. & 15%	No change	None
Japan and imit. Japan, plain	3c lb. & 15%	No change	None
Bristol board, plain	3c lb. & 15%	No change	None
Ledger, bond, record, tablet, plain	3c lb. & 15%	No change	None
Typewriter, manifold, plain	3c lb. & 15%	No change	None
Onionskin, and imit. onionskin, plain	3c lb. & 15%	No change	None
Writing, letter, and note, processed	3c lb. & 25%	No change	None
Drawing, processed	3c lb. & 25%	No change	None
Hand made paper, processed	3c lb. & 25%	No change	None
Japan and imitation Japan, processed	3c lb. & 25%	No change	None
Bristol board, processed	3c lb. & 25%	No change	None
Ledger, bond, record, tablet, processed	3c lb. & 25%	No change	None
Typewriter, manifold, processed	3c lb. & 25%	No change	None
Onionskin, and imitation onionskin, processed	3c lb. & 25%	No change	None
Papeteries, and box stationery	3c lb. & 25%	50%	About 15%
Hanging paper, not printed, etc.	10%	¼c lb. & 15%	¼c lb. & 5%
Hanging paper, printed (wall paper)	1½c lb. & 20%	No change	None

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Article	Present rate	Proposed rate	Additional duty requested
	—Par. 1309—		
Wrapping paper	30%	No change	None
Filtering paper	5c lb. & 15%	No change	None
Paper not specially provided for	30%	No change	None
	—Par. 1313—		
Papers—die cut	30%	No change	None
Paper board—die cut	30%	No change	None
Pulp board—die cut	30%	No change	None
Card board—die cut	30%	No change	None
Leather board—die cut	30%	No change	None
Paper board—processed	30%	No change	None
Pulp board—processed	30%	No change	None
Card board—processed	30%	No change	None
Leather board—processed	30%	No change	None
Press board, and press paper	30%	No change	None
Test container board	20%	No change	None
Stereotype-matrix mat or board	35%	No change	None
Paper boxes	35%	No change	None
Manufactures of paper not specially provided for	35%	No change	None

Printing Paper

Felix Pagenstecher, of the Bryant Paper Company, Kalamazoo, Mich., manufacturers of printing paper, urged that there be a clearer definition of book paper, to prevent importation free as news print and an increase of the ad valorem part of the present duty from 10 to 15 per cent. He complained of importations from Germany due largely, he said, to lower wages there and lower carrying costs to the eastern seaboard of this country than from Western mills. Foreign producers are installing machinery that is as modern and efficient as that used in this country, he said.

American Capital In Foreign Countries

In answer to a question the witness said that he "had just been told that about $580,000,000 of American capital is invested in paper producing facilities in foreign countries, mostly in Canada."

In answer to a question by Representative Garner, the witness said he thought duties on news print paper would have caused that capital to be invested in this country.

Book Paper

Howard W. Taylor, of W. C. Hamilton & Sons, Inc., Miquon, Pa., filed a brief on book paper duties.

Duties on paper board production, which occupies, he said, 67 per cent of the paper industries, were discussed by R. K. Ramsey, of the Hinde & Dauch Paper Company, Sandusky, Ohio. He said that no change in duties was to be requested, but that a rewriting of Paragraph 1302 is asked.

Box Board

Representative Rainey (Dem.), of Carrollton, Ill., questioned Henry D. Schmidt who spoke for 51 box board mills, about conferences for the purpose of bringing about "reforms" in the paper board industry, and statements to the effect that in many plants employees work "11 to 13 hours a day."

The witness said they were not asking for an increase in duties. In answer to another question he estimated overproduction at 25 per cent.

Wood Pulp Board

W. Irving Osborne, of the Cornell Wood Products Company, Cornell, Wis., asked that the duty on wood pulp board be ½-cent a pound and 10 per cent ad valorem, complaining of importations at prices, plus present duty, which are less than domestic production costs.

Tissue Paper

R. H. Thompson, New York City, spoke for tissue paper manufacturers and said that production is capable of being raised from about $50,000,000 to $60,000,000 worth a year. Present duties have not discouraged importations of high-grade tissues, amounting, he stated, to about 4 per cent of domestic production. He urged "slight increases" in duties.

Representative Garner called attention to figures indicating, he said, that exportations almost equal importations. The witness thought that exportations largely might be of low-grade papers.

Surface Coated Paper

Nelson R. Davis, of the S. D. Warren Company, Boston, Mass., spoke for manufacturers of surface-coated paper. He urged maintenance of present rates. In answer to a question the witness estimated present overproduction at 10 per cent, total output being he said, about 450,000 tons a year. He said that he was in favor of giving producers of his raw materials the same protection asked for finished products, and would expect compensatory increases for the finished product in case of increase of duties on raw material like casein. Only the strongest companies, he thought, could survive if the industry had to absorb duty increases on raw materials.

Glassine and Grease Paper

L. T. Stevenson, of the Rollstone Paper Company and the Mountain Mill Company, of New York City, spoke with reference to glassine and grease-proof papers. He asked that the painted, embossed or decorated papers of this kind be excluded from designations of other kinds so as to be made dutiable at higher than present rates, maintenance of the rates on the other kinds being advocated.

He estimated productive capacity of the industry as approximately 20 per cent greater than demand.

Glazed and Fancy Paper

L. O. Van Duzer asked for a "slight advance" of duties on glazed and fancy paper manufacturers and for changes in descriptive terms covering new forms of these papers developed since the present tariff law was adopted.

Vegetable Parchment

J. Kindleberger, of the Kalamazoo Vegetable Parchment Company said on behalf of manufacturers that vegetable parchment is a double-process paper and has been classed hitherto with single process papers. He asked that this be connoted by the law and that vegetable parchment paper be put under duties of 4 cents a pound and 20 per cent ad valorem instead of rates of 3 cents and 20 per cent now applying.

Gummed and Simplex Decalcomania

William M. McLaurin, of the McLaurin-Jones Company, Brookfield, Mass., and George Goodsir, New York City, said they would rest their case for manufacturers of gummed and simplex decalcomania papers on the general brief filed by Mr. Everest for the American Paper and Pulp Association.

Waxed Paper

Paul S. Hanway, New York City, filed, for the American Wax Paper Association, a brief supporting maintenance of present duties on wax paper.

The Writing Paper Manufacturers Association was represented by S. L. Willson, of the American Writing Paper Company, Holyoke, Mass.

He asked that there be no charge in rates but that colored writing and cover papers coming in sometimes under other duties be made subject to writing and cover paper rates.

In answer to a question, Mr. Willson "estimated the overcapacity of the entire paper industry at 20 to 25 per cent."

Speaks for Importers and Traders

Ernest Child, New York City, spoke for the papers group of the National Council of Importers and Traders. Exportations of paper products amount to about $30,000,000 and importations of other than news print to about $12,000,000, he declared. Importations of book paper comprise mostly high-grade specialties not produced in this country, he said. He thought the duty could be reduced and still afford domestic producers adequate protection.

(*Continued on page 309*)

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Paper Board Rules of Business Practice

Ten of Seventeen Rules Adopted by Sixty-five Percent of the Tonnage of the Industry Are Affirmatively Approved by the Federal Trade Commission as Applying to Possible Law Violations While Remaining Seven are Accepted Only as Expressions of the Trade

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 19, 1929.—Seventeen rules of business practice adopted by the paper board industry at trade practice conferences held last November in Chicago and New York under auspices of the Federal Trade Commission, former Commissioner Abram F. Myers presiding, have now been acted upon by the commission. Ten rules were affirmatively approved by the commission as applying to possible law violations (Group I) while the remaining seven were accepted only as expressions of the trade (Group II).

Manufacturers of paper board representing a total of sixty-five per cent of the tonnage of the industry were present. There were also manufacturers of corrugated and solid fiber boxes representing seventy-three per cent in tonnage, and manufacturers of folding boxes representing forty per cent of the tonnage. It was explained at the time that this forty per cent showing was considered sufficient because that group comprises a large number of small plants scattered throughout the country, the aggregate volume of which is large, but the individual tonnage of which is comparatively unimportant.

The paper board or mill group manufacture liners, chip, straw board and folding box boards, which are made from kraft, waste paper and straw. Their products are used by the corrugated and solid fiber box or container group, who make shipping cases, and by the folding box group.

The industry approved a rule providing that: "The selling of goods below cost, except to meet a price offered by a competitor, is condemned as unfair competition." The commission, however, substituted for this rule the following: "The selling of goods below cost for the purpose of injuring a competitor and with the effect of lessening competition is an unfair trade practice." This rule as modified was transferred by the commission from Group II to Group I.

The commission rejected a rule offered by the industry concerning distribution of price lists because in the present state of the law the commission cannot receive a resolution for the circulation of prices which is not confined to past transactions. The proposed resolution of the industry read as follows: "The industry hereby records its approval of the practice of distributing and circulating to the entire industry current price lists and all notices of advance or decline in prices made by any manufacturer."

The industry as represented at the conference agreed that the rules adopted shall apply to "all manufacturers of corrugated, solid fiber and folding boxes, as well as to manufacturers of any and all paper or paper board used in the manufacture of said boxes and their interior parts."

The rules affirmatively approved by the commission and those accepted as expressions of the trade are reported in full text in the letter to members of the paper board industry, which is as follows:

Statement of the Commission

A Trade Practice Conference for the Paper Board industries was held at the Sherman Hotel, Chicago, on November 3, 1928, and adjourned to New York City, where it reconvened at the Waldorf-Astoria Hotel on November 23, 1928, at both of which meetings Abram F. Myers, Commissioner of the Federal Trade Commission, presided, assisted by Stephen C. Van Fleet, Assistant Director of Trade Practice Conferences. H. S. Adler acted as secretary of the conference.

There were present at the conference manufacturers of Paper Board representing a total of 65 per cent of the tonnage of the industry; manufacturers of corrugated and solid fiber boxes representing 73 per cent in tonnage, and manufacturers of folding boxes representing 40 per cent of the tonnage. It was stated that the 40 per cent showing for the folding box group is satisfactory, since this group comprises a large number of small plants scattered throughout the country the aggregate volume of which is large, but the individual tonnage of which is comparatively unimportant.

The paper board, or mill group, are manufacturers of liners, chip, straw board and folding box boards, which are made from kraft, waste paper, straw, etc. Their products are used by the two following groups:

The corrugated and solid fiber box or container group are manufacturers of shipping cases for transportation by express or freight, or by other means, of such articles as need protection;

The folding box group are manufacturers of the folding boxes which protect numerous articles during sale. These boxes have various types of paper facing on which the labels are printed.

All of the following rules except Rule 5 and Rule 9 (formerly Res. 14) were unanimously adopted at the Chicago meeting. No agreement could be reached at Chicago on these rules, and additional time was requested for their further consideration. This was granted, and the conference was adjourned to reconvene at the Waldorf-Astoria Roof Garden, New York, N. Y., on November 23, 1928, at which time Resolution 5 and Resolution 14 (now Rule 9) were adopted without a dissenting vote. One member asked to be recorded as not voting on either of these resolutions.

Rule 9 is substituted by the Commission for former resolution 14. Former resolution 14, as adopted by the industry, read as follows:

"The selling of goods below cost, except to meet a price offered by a competitor, is condemned as unfair competition.

"(Note): Sales below cost if persistently made inevitably result in bankruptcy of the seller. If only occasionally made, such sales may result in price discrimination, in that an undercost price to one buyer is hoped to be offset by too high a price to another buyer. Sales below cost are sales which fail to take into account every item which should enter into the cost of the product."

Resolution No. 16 was rejected by the Commission for the reason that in the present state of the law the Commission cannot receive a resolution for the circulation of prices which is not confined to past transactions. Said resolution reads as follows:

"DISTRIBUTION OF PRICE LISTS.

"The industry hereby records its approval of the practice of distributing and circulating to the entire industry current price lists and all notices of advance or decline in prices made by any manufacturer."

The remaining rules of business conduct adopted in resolution form are arranged in the following groups. Those appearing under Group I are affirmatively approved by the Commission; those falling under Group II are accepted by the Commission as expressions of the trade.

The following definition as to the branches of the industry to be covered by the resolutions adopted was agreed to by the conference:

PREAMBLE: These trade practice rules shall apply to all manufacturers of corrugated, solid fiber and folding boxes, as well as to manufacturers of any and all paper or paper board used in the manufacture of said boxes and their interior parts:

Group 1

RULE 1. INTERFERENCE WITH CONTRACTS

Inducing or attempting to induce the breach of a contract be-

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tween a competitor and his customer during the term of such contract is an unfair method of competition.

(Note): Whenever notice of the existence of a contract is brought to the attention of any person in any way, he shall promptly discontinue all efforts which might induce a contracting party to break such contract.

RULE 2. DEFAMATION OF COMPETITORS

The defamation of a competitor by words or acts which untruthfully call in question his business integrity, his ability to perform his contracts, his credit standing, or the grade, quality or count of his goods, is condemned as unfair competition.

RULE 3. ENTICEMENT OF EMPLOYEES

Interference with a competitor's business through the enticement of employees from his employment is an unfair trade practice.

(Passed with the understanding that this resolution refers to illegal enticement.)

RULE 4. THREATS OF SUIT FOR PATENT OR TRADEMARK INFRINGEMENT

The circularization of threats of suit for infringement of patent or trademark among customers of a competitor, not made in good faith, but for the purpose of harassing and intimidating customers, is an unfair trade practice. The owner of a patent or trademark should, in fairness, deal directly with the alleged original infringer rather than attempt to intimidate his customers.

RULE 5. PRICE DISCRIMINATION

Any discrimination in the price of paper board or boxes between purchasers of the same class, not including discrimination in price on account of the difference in grade, quality or quantity of the product sold, or which makes only due allowance for difference in cost of selling and transportation, or discrimination in price in the same or different communities not made in good faith to meet competition, where the effect of such discrimination may be to substantially lessen competition or tend to create a monopoly, is an unfair trade practice: *Provided,* however, that nothing in this resolution shall be construed to prevent the publication and use of a special quantity price applicable to a definite quantity of goods which are placed in one order and, at the option of the shipper, are moved as one shipment.

RULE 6 (FORMERLY RESOLUTION 9). FALSE BRANDING

The certification of corrugated and solid fiber boxes as complying fully with the published rules of the carriers, when in fact such is not the case, misleads the buyer, deceives the consumer, and is condemned as unfair competition.

(Note): The rules of the carriers relating to fiber box specifications are contained in the following tariffs published under authority of the Interstate Commerce Commission:

Consolidated Freight Classification No. 5:
I.C.C. O.C. 49 (Official)
I.C.C. 18 (Western)
I.C.C. 23 (Southern)
Official Express Classification No. 30 (I.C.C. 3280)
Agent B. W. Dunn's Tariff No. 1 (I.C.C. No. 1).

These rules require that solid fiber and corrugated boxes used in Interstate Commerce must comply with certain tests and specifications as prescribed in the published schedules of the carriers. They further require that all such boxes used in interstate commerce bear the certification of the box maker reciting that the box in question complies with such rules. It is in the interest of this industry and of the consuming public that these published rules be strictly complied with.

RULE 7 (FORMERLY RESOLUTION 10). FALSE CERTIFICATION

The certification of corrugated and solid fiber boxes, as required by the published schedules of the carriers, by others than the box makers who actually made the boxes, deceives the carriers and the consuming public as to the name of the actual maker of the box, and is condemned as unfair competition.

RULE 8 (FORMERLY RESOLUTION 11). UNDERBIDDING BY OFFERING INFERIOR PRODUCTS

The misrepresentation of paper board or boxes in respect to size, style, caliper, bursting strength, substance or quality, is condemned as unfair competition.

(Note): Producers asked to submit on furnished samples or on definite specifications sometimes submit bids on inferior samples or inferior specifications, and at the same time lead the prospective purchaser to believe that the products which they propose to furnish is equal to the submitted sample or equal to the box or material described in the specifications.

RULE 9 (FORMERLY RESOLUTION 14—AS AMENDED BY THE COMMISSION). SALES BELOW COST

The selling of goods below cost for the purpose of injuring a competitor and with the effect of lessening competition is an unfair trade practice.

RULE 10 (FORMERLY RESOLUTION 17). OBSERVANCE OF RESOLUTIONS

WHEREAS, the strict observance in good faith of all these resolutions being to the best interests alike of the buyers and of the sellers of paper board and boxes; Be it therefore

RESOLVED, that the secret violation of any of said resolutions, those accepted by the Federal Trade Commission merely as expressions of the industry as well as those approved by said Commision, shall be deemed to be an unfair method of competition.

Group II

RULE 11 (FORMERLY RESOLUTION 6). SECRET REBATES

The payment or allowance of secret rebates, refunds, credits or unearned discounts, whether in the form of money or otherwise, or extending to certain purchasers special services or privileges not extended to all purchasers under like terms and conditions, is an unfair trade practice.

(Note): This rule applies to such practices as the purchase of box clippings from customers at abnormally high prices, secret agreements to deliver board or boxes of a higher test or grade or of a greater caliper than called for by contract, the making of split or deferred deliveries when the contract calls for a single delivery, the making of excessive transportation allowances, and other similar evasions.

RULE 12 (FORMERLY RESOLUTION 7). SALES WITHOUT MUTUALITY

Contracts of sale which permit the buyer to cancel or provide for a reduced price in the event of a market decline, and which do not permit the seller to cancel or provide for an enhanced price in the event of a market rise, are lacking in mutuality and tend to induce controversy and breach of contract, and are therefore condemned as unfair competition.

RULE 13 (FORMERLY RESOLUTION 8). DUMPING IN REMOTE MARKETS

The practice of certain manufacturers and sellers of shipping quantities of merchandise into territories outside their normal territories, and of selling such merchandise below the general market prevailing in such other territories into which shipments are made, seriously tends to demoralize the market within the territories into which shipments are made, disrupts normal competitive conditions throughout the entire industry, and is condemned as an unfair trade practice.

RULE 14 (FORMERLY RESOLUTION 12). OVER RUNS AND UNDER RUNS

The delivery of over-runs of paper board or boxes free of charge, or at a concession in price, results in price discrimination as between customers, and is condemned as unfair competition.

(Note): In the practical operation of a paper board mill or box plant it is economically impossible to fill an order for any specific quantity of paper board or boxes without there being some over runs or under runs. For this reason it is the established custom of the trade to permit a reasonable variation either way in making actual deliveries, the customer paying for the quantity actually delivered, whether reasonably more or less than the quantity specified in the contract.

RULE 15 (FORMERLY RESOLUTION 13). FREE WAREHOUSING

It is the judgment of this industry that all quoted prices should be on the basis of delivery upon completion of manufacture. If the buyer requests of postponement of the shipment beyond the date originally specified a separate charge shall be made to cover

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the full cost of warehousing the goods. Any violation of this rule results in price discrimination as between customers, and is condemned as unfair competition.

RULE 16 (FORMERLY RESOLUTION 15). COST ACCOUNTING

It is the judgment of this industry that an accurate knowledge of costs is indispensable to intelligent and fair competition, and the general adoption of accurate and uniform methods of cost finding and estimating as a means of correcting the various unfair practices heretofore mentioned is strongly recommended.

RULE 17 (FORMERLY RESOLUTION 18). CONTINUATION OF CONFERENCE

RESOLVED, that this conference of the paper board industry be continued as a permanent conference for the suppression of unfair trade practices and that the Executive Committee of the Paper Board Industries Association shall cause to be selected such committee or committees, composed of members and non-members of the Paper Board Industries Association, to investigate alleged violations of these resolutions and to make complaints of such violations to the Federal Trade Commission, and if deemed advisable, such executive committee may request the Federal Trade Commission from time to time to call new conferences of the industry for the purpose of amending these resolutions.

RESOLVED, further, that such committee be authorized to send its accredited representatives from time to time to the plants of all producers to make such investigations or inspections as may be necessary to determine whether the resolutions adopted by this conference are being observed in letter and in spirit.

Those Present at First Conference

The names of the companies represented at the first conference follow. A number of these were represented at both conferences, and are indicated by a "star" preceding the name:

Alton Box Board Company, Terre Haute, Ind., F. B. Ijams; *American Corrugated Paper Products Corporation, New York, Samuel Samuels and O. L. Solonion; American Box Board Company, Grand Rapids, Mich., W. A. Jack; Advance Corrugated Box Company, Chicago, Samuel Friedman and D. M. Singer; Ajax Box Company, Chicago, B. F. Harman; Alton Box Board and Paper Company, Alton, Ill., H. C. Evans; Acme Paperboard Company, W. G. Shortess.

Brack Container Corporation, Rochester, N. Y., A. L. Brack; *Buffalo Box Factory, Buffalo, N. Y., J. B. Fenton; Board Products Publishing Company, Chicago, N. F. Rehm; Saul Bernstein, New York City, representing 16 New York firms; *Bird & Son, Inc., E. Walpole, Mass., C. H. Andrews; *Board Products Publishing Company, Chicago, N. F. Rehm and D. J. Beaton.

Cedar Rapids Paper Box Company, Cedar Rapids, Ia., R. L. Savage; *Chicago Label and Box Company, Chicago, Irving Randall and C. J. Norris; Campbell Paper Box Company, South Bend, Ind., J. B. Campbell; *Carthage Pulp and Board Company, Philadelphia, Pa., Homer Reed, Jr., and W. C. Rommel; *Container Corporation of America, Chicago, W. G. Carey, J. P. Brunt, and W. P. Paepcke; Chicago Fibre Box Company, Chicago, C. J. Gates; *Continental Paper Company, Bogota, N. J., W. J. Alford, Jr.; Climax Manufacturing Company, Castorland, N. Y., W. C. Hirschey; Chicago Carton Company, Chicago, E. J. Mulholland.

Dixon Board Mills, Chicago, C. H. Goodnow; Downing Box Company, Milwaukee, Wis., E. F. Johnson; *C. E. Downey Box Company, Kansas City, Mo., M. M. Madson.

*Empire Printing and Box Company, Atlanta, Ga., Joseph Hirsch; Eggerss-O'Flying Company, A. J. Eggerss; Evans Fibre Box Company, Chicago, S. A. Van Horne; Eddy Paper Corporation, Chicago, G. G. Otto.

James Flett, Chicago; *Ferdinand Funke Sons Company, Cincinnati, Ohio, Wm. Siemon; Fairmont Box Company, Fairmont, W. Va., R. H. Dollison; *Fibre Board Products, Inc., San Francisco, Cal., J. M. Connor and J. D. Zellerbach; *Fort Orange Paper Company, Castleton on Hudson, N. Y., W. L. Latham; *Fort Wayne Corrugated Paper Company, Ft. Wayne, Ind., J. J. Brossard; Federal Paperboard Company, Bogota, N. J., W. G. Shortess.

*Robert Faylord, Inc., St. Louis, Mo., J. M. Arndt and W. F. Fahey; *Grand Corrugated Paper Company, Brooklyn, N. Y., Bernard Rous; Robert Gair Company, New York, G. W. Gair and H. C. Campbell; Graham Paper Company, St. Louis, Mo., Eric Bernays; *Gibraltar Corrugated Paper Company, North Bergen, N. J., Samuel Katz; Gummed Industries Association, Chicago, I. M. Henry; Genesee Paper Mills, Inc., Scottsville, N. Y., D. F. Lawless; Gebhart Folding Box Company, Dayton, Ohio, L. H. Gebhart; *Gardner & Harvey Company, Middletown, Ohio, E. T. Gardner and M. S. Johnston; *Globe Folding Box Company, Cincinnati, Ohio, H. H. Stoneberger.

Hunt Crawford Company, Coshocton, Ohio, H. B. Hunt; *Hinde & Dauch Paper Company, Sandusky, Ohio, Sidney Frohman and J. H. MacLeod.

Inland Box Corporation, Indianapolis, Ind., H. C. Krannert; *International Paper Company, Chicago, D. B. Haven; Illinois Carton and Label Company, Chicago, A. V. Z. Jennings; Inland Paperboard Company, Bogota, N. J., W. G. Shortess.

*Jackson Box Company, Norwood, Ohio, W. J. Cassady.

*Karle Litho Company, Rochester, N. Y., W. J. C. Karle; Kellogg Box Board Company, Battle Creek, Mich., E. P. Corcoran; Kellogg Company, Battle Creek, Mich., R. T. Adams; *Kress Box Company, F. J., Pittsburgh, Pa., F. J. Kress; Kreckhefer Container Company, Chicago, G. G. Otto.

Lafayette Box Board Company, Terre Haute, Ind., F. B. Ijams; Lawless Brothers Paper Mills, Inc., E. Rochester, N. Y., D. F. Lawless; Lauzit Corrugated Box Company, Chicago, M. Norian; Liberty Paperboard Company, W. G. Shortess.

*Monroe Paper Products Company, Monroe, Mich., W. M. Sawyer and N. R. Harris; Minneapolis Corrugated Box Company, St. Paul, Minn., C. G. Maher; *Midwest Box Company, Chicago, J. P. Brunt; McEwan Bros., Whippany, N. J., W. J. Alford; *Mobile Paper Mills, Mobile, Ala., R. J. Milling and Clay Burdick; Mt. Vernon Strawboard Company, Chicago, D. S. Pettitt; Midvale Paperboard Company, Bogota, N. J., W. G. Shortess.

National Box and Specialty Company, Sheboygan, Wis., J. P. Vuhulst and L. W. Becker; National Container Corporation, Long Island City, N. Y., Samuel Kipnis; *North Star Strawboard Mills, Quincy, Ill., R. O. Schermack and A. B. Thomas; B. F. Nelson Manufacturing Company, Minneapolis, Minn., Henry T. Pratt; C. E. Nelson, Otego, Mich.

Oshkosh Corrugated Box Manufacturing Company, Oshkosh, Wis., John Oelebeke; *Ontonagon Fibre Company, Ontonagon, Mich., D. C. Everest and J. F. Sickman; *Ottawa River Paper Company, Toledo, Ohio, G. H. Broderick and F. E. Smyser; *Ohio Box Board Company, Rittman, Ohio, J. J. Gannon.

Purchasing Agents' Association of Chicago, Chicago, Burton Verner; *Paperboard Industries Association, Chicago, H. S. Adler, G. A. Metz, E. O. Merchant, H. A. Dickie, B. J. Raeber, and G. R. Browder.

Rockford Fibre Container Company, Rockford, Ill., F. E. Menor; Richardson Company, Lockland, Ohio, W. H. Richardson; *River Raisin Paper Company, Monroe, Mich., C. L. Wood and J. F. Gray.

Sefton Manufacturing Corporation, Chicago, C. H. Goodnow; John Strange Paper Company, Menasha, Wis., Hugh Strange; *Scharff Koken Manufacturing Company, St. Louis, Mo., E. E. Scharff; *Schiffenhaus Brothers, Newark, N. J., J. W. Schiffenhaus and Wm. Schiffenhaus; Superior Paper Products Company, Carnegie, Pa., G. B. Beaman; *Schmidt & Ault Paper Company, York, Pa., H. D. Schmidt and Spurgeon Spangler; Self-Locking Shurmann Company, Chicago, W. A. Shurmann; The *Shears*, Chicago, H. E. Roden and G. W. Whitcomb.

*Tennessee Paper Mills, Chattanooga, Tenn., A. M. Shepperd.

*United Paperboard Company, New York City, Raymond Bee and Sidney Mitchell.

*David Weber & Co., Philadelphia, Pa., David Weber; Waldorf Paper Products Company, St. Paul, Minn., P. M. Myers; *Weston Paper and Manufacturing Company, Dayton, Ohio, H. I. Herman;

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HYDRAULIC TURBINES

We will gladly send you copies of the exceptional results of FIELD TESTS made in connection with the Backus-Brooks Co. and St. Croix Paper Co. Hydraulic Turbine Installations.

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Falpaco Coated Cardboard

45 Distributors in 1923

58 Distributors in 1925

66 Distributors in 1927

74 Distributors in 1929

FALULAH PAPER COMPANY, Inc.

WOOLWORTH BUILDING, NEW YORK

Wabash Fibre Box Company, Terre Haute, Ind., W. M. Myers; *Warner & Childs Company, Medford, Mass., R. M. Taylor.

Those Present at Second Conference

The following companies were represented at the second conference only:

Ashtabula Corrugated Box Company, Ashtabula, Ohio, B. S. Hubbard and Geo. C. Hubbard, Jr.; American Paper and Pulp Association, New York City, O. M. Porter; American Can Company, New York City, E. H. Klein, C. A. Enright and C. H. Peterson.

Brown & Bailey Company, Philadelphia, Pa., H. T. Brown; Ball Brothers Company, Muncie, Ind., Hugo Friedricks, Jr.; Baltimore Paper Box Company, Baltimore, Md., B. H. Catzen; J. S. Barshay, New York City (representing 13 independent folding box manufacturers); Saul Bernstein, New York City (representing several New York manufacturers).

Chemical Paper Manufacturing Company, Holyoke, Mass., J. E. Holmes; Corrugated Box Corporation, Hoboken, N. J., E. Koplitz; Clifton Paper Mills, Passaic, N. J., T. M. Butler; Consolidated Paper Company, Monroe, Mich., H. L. Rauch; Chesapeake Paper Board Company, Baltimore, Md., J. E. Smith.

Densen Carton Co., Inc., Ridgefield Park, N. J., H. M. Hess and R. F. Goffney; Densen Corrugated Paper Company, Ridgefield Park, N. J., R. F. Goffney.

Eastern Box Company, Baltimore, Md., F. W. Wagner.

Fibre Containers, Chappaqua, N. Y., E. M. Gordon; Folding Box Manufacturers Association, New York City, J. S. Barshay and R. F. Goffney; Fibre Board Container Co., Richmond, Va., D. J. Donati, Jr.

Grasselli Chemical Company, Cleveland, Ohio, W. R. Roche.

Hudson Bag Company, Brooklyn, N. Y., H. T. Rosenfeld; Hercules Paper Box Company, Columbus, Ohio, E. A. Donnan; Hygrade Corrugated Paper Products Corporation, Long Island City, N. Y., Harry Kouser; Hummell & Downing Company, Milwaukee, Wis., G. E. McKowen; Halltown Paper Board Company, Halltown, W. Va., P. P. Nelson.

Metropolitan Paper Box Manufacturers Association, New York, H. E. Roden; Minnesota & Ontario Paper Company, Chicago, W. A. Bell; Menasha Wooden Ware Corporation, Menasha, Wis., R. L. LaRue.

New Haven Pulp and Board Company, New Haven, Conn., J. S. Miller; National Paper Box Manufacturers Association, Brooklyn, N. Y., H. P. Berkett and W. E. Trum; National Folding Box Company, New Haven, Conn., H. S. Hinkle.

Pomeroy Manufacturing Company, Vincennes, Ind., H. Pomeroy; Pomeroy Schofield Company, Chicago, H. Pomeroy; Penn Fibreboard Corporation, York, Pa., A. A. Otens and Wm. Etra; Pequot Manufacturing Corporation, Glendale (Queens), N. Y., F. S. Oppenheim.

Robertson Paper Box Company, Inc., Montville, Conn., R. A. Powers; Rochester Folding Box Company, Rochester, N. Y., W. E. Bowersock; Russell Box Company, Chelsea, Mass., H. M. Russell.

Shelton Manufacturing Company, Inc., Long Island City, N. Y., J. R. Nierhenberg; Star Corrugated Box Company, Inc., Maspeth, N. Y., Louis Etra; Sonoco Products Company, Haresville, S. C., C. W. Coker; Smeallie & Voorhees, Inc., Amsterdam, N. Y., J. L. Voorhees and J. D. Smeallie; Shenandoah Box Board Corporation, Winchester, Va., N. H. Carpenter.

United States Printing and Lithograph Company, Norwood, Ohio, W. M. Reid.

Whiting, Grafton, Chicago.

The following were represented through proxy:

I. & G. Young, Inc., Isidor Young; E. J. Trum, Inc., W. E. Trum; Universal Folding Box Company, N. Niebanck; Continental Folding Paper Box Company, Chas. Rossum; International Folding Box Company, Fred Gilman; Eastern Folding Box Company, Inc., Ralph Aronoff; Banner Folding Box Company, J. J. Weil; Shuttleworth Carton Company, L. W. Bernard; Keystone Folding Box Company, Inc., R. L. Jewell; Acme Folding Box Company, J. L. Greenberg; Wilkata Folding Box Company, H. G. Wharton; Albert Paper Box Company, Inc., G. J. Dubey.

ASK MORE PROTECTION

(*Continued from page 301*)

Importations of wrapping paper, not including craft, he stated, have been declining, with craft production increasing.

European prices of writing and bond papers are higher as a rule, he said, than the prices of domestic products. He recommended a reduction of the duty.

He also recommended a reduction of duty on hand-made paper and reclassification of tissue papers. He asked also for a changed definition of news print.

Straw Paper

N. H. Carpenter, of the Coshocton Straw Paper Company, Coshocton, Ohio, spoke for 19 mid-western manufacturers anent straw wrapping paper, producing about 360,000 tons valued at $18,000,000 in 1928. The product has been displaced by wood pulp paper in the wrapping sphere but has found another large use as straw board for containers, he said. He complained of large importations from Holland dutiable as board. He asked that the definition of paper be .012 of an inch so as to bring the competing importations under the straw paper duty, which he asked be maintained as at present.

Wall Paper

The Wallpaper Manufacturers Association was represented by Henry Burn, Brooklyn, N. Y., who complained that wallpaper is defined in the law by the conference committee which handled the bill as "hanging paper." Dimensions of rolls vary greatly in different countries, he said, and he asked that the duty be based on 36 square inches as the unit.

Imported Wallpaper Said to Be Copied

Edward I. Dunn, New York City, speaking for importers said that importations amount to only 2½ per cent of hanging papers. Importers, he said, are compelled to bring in only qualities not produced in this country. These benefit American producers by making new designs available to them, the witness said. He exhibited "copies" of foreign papers sold for less than import prices.

MIAMI SUPERINTENDENTS MEET

[FROM OUR REGULAR CORRESPONDENT]

DAYTON, Ohio, February 11, 1929.—The February meeting of the Miami Valley division of the American Pulp and Paper Mill Superintendents' Association was conducted Saturday night at the Engineers' Club in this city.

Most of the paper manufacturing plants in the Miami Valley were represented at the gathering, which was one of the most enjoyable of the winter season. The Engineers' Club is ideally located, across the street from the Conservancy District Building, both structures having been erected through the initiative of Col. Edward A. Deeds and Charles F. Kettering, of the General Motors.

A varied program of entertainment was provided, including motion pictures and a talk on Terry steam turbines by L. E. Protter and a talk and pictures by B. E. Kiefer, who told of the virtues of Timken bearings.

Altogether the session was one of special interest and the dinner and attendant festivities were greatly enjoyed by the mill representatives and those present who represented kindred interests.

COLIN K. ANDERSON DEAD

Colin K. Anderson, for many years a prominent figure in paper manufacturing circles of Northern New York, died last week at his home here following an extended illness. He was about 75 years old and virtually his entire life was spent in this section. He was superintendent of the Battle Island plant of the Arrowhead Corporation for several years and more recently he had been associated with the Draycott Mills, of this place, in an executive capacity. He was prominent in fraternal circles in addition to taking an active interest in political affairs. He is survived by one son and three sisters.

Esleeck Manufacturing Company, Turners Falls, Mass.

Onion Skin, Manifold and Typewriter Papers

Products sold by leading Wholesale Paper Merchants

PRODUCTS:

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For many years we have specialized in the manufacture of high grade Onion Skin, Manifold, and Thin Typewriter Papers (Basis 7¼ to 13 lbs.) made from new Rags. Our watermarked grades are well and favorably known throughout the country.

OUR WATERMARKED PAPERS:

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(Sub. 8—White and 9 colors)
Fidelity Onion Skin
(Sub. 9—White only)
Emco Onion Skin
(Sub. 10—White and 8 colors)
Recorder Bond
(Sub. 12—White and 7 colors)

USES:

Owing to the Legibility, Durability and Permanency of our papers they are entirely satisfactory for:

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Factory Forms	**Specifications**
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Save Filing Space and Postage by using our papers for Correspondence, Records and Forms.

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White Sulphite Bond
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Tablet Papers
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Label Papers
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SPRING GROVE, PA.

(Established 1864) ***(Capacity 100 Tons Daily)***

Big Power Show Attracts Thousands in Chicago

Manufacturers of Power Machinery and Appliances Identified With Paper Industry Display Latest Contributions to Power At Fourth Midwestern Engineering and Power Exposition and Fourth Midwest Power Engineering Conference, Held In Coliseum

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., February 18, 1929.—Chicago was headquarters of the world of power the week of February 12 to 16 inclusive when thousands of men identified with power engineering activities assembled for the fourth Midwestern Engineering and Power Exposition and the fourth Midwest Power Engineering Conference held at the Coliseum, Chicago.

More than $1,000,000 worth of power machinery and appliances were on display before thousands of interested spectators at the Coliseum. Over 300 manufacturing companies from all parts of the country were on hand to display their latest contributions to power. Everything from the largest to the smallest units were on exhibition from huge boilers and electric motors to automatic hoists and small appliances.

Included in the list of exhibitors were a number of power manufacturers whose names are identified with the paper industry and their contributions were universally arranged to give the spectator an insight into the branches of industry so necessary to the full and proper development of the paper world.

A feature of the week was the annual banquet held at the Palmer House on Thursday, the 14th, at which time Walter Dill Scott, president of Northwestern University, was the chief speaker.

Interesting Exhibits

Included in the list of exhibitors were the following manufacturers and distributors:

The Fisher Governor Company exhibited its power plant specialties, including a complete line of Fisher pump governors. A neighboring exhibitor was the Durametallic Corporation giving a complete display of Durametallic packings together with actual illustrations of the prominence of packing costs and the time lost while packings are being replaced or adjusted.

Water testing equipment for laboratory and power plant use provided the chief items of interest in the display of the National Aluminate Corporation. The Power Plant Specialty Company received a great deal of attention from the display of the Vater Water Softening System. Outstanding developments in belt lacings destined to speed up production were exhibited by the Clipper Belt Lacer Company while the Palmer-Bee Company of Detroit, used unusually successful methods in displaying Palmerbee I-Beam Trolleys and Geared Trolleys.

The design, function, necessity and performance of anti-friction bearings was the theme of the display of the Timken Roller Bearing Company, while the Armstrong Machine Works exhibited six points of their steam trap to interested technical observers. A complete line of draft gages, gas analyzers, portable test sets and draft recorders were included in the booth of the Hays Corporation of Michigan City. This complete line of fuel savers constituted an interesting exhibit.

The Stephens-Adamson Company exhibit carried working examples of a new speed changer known as the JFS in which a turn of a wheel controls the speed of the machine.

The A. W. Cash Company of Decatur, Ill., had an excellent exhibition space at the entrance to the South Hall and utilized its position to display the Craig Control, a draft regulator which is fundamentally a beam scale which automatically weighs the slightest change in over-fire draft. The new C-H motor driven valve operating unit designed by Cutler-Hammer engineers, which has been twelve years in development, was a feature of the Cutler-Hammer automatic valve operation display. Flow meters, the results of long years of testing and experience, were displayed by the Republic Flow Meters Company of Chicago and the display included samples of a very effective direct mail campaign lately completed successfully.

Thermal Units Demonstrated

The Thermal Units Company of Chicago, a subsidiary of the Mechanical Manufacturing Company, utilized its space to exhibit the Thermal Unit system of space heating and cooling and for the dehydration processes of food products, leather, paper, etc. "Instant" Copper Tube Steam water heaters, manufactured by the Instant Water Heater Sales Division and distributed by the Barrett-Christie Company formed an interesting exhibit in the South Hall of the Coliseum. Single stage double suction pumps, made by the Economy Pumping Machinery Company of Chicago, including the Centrifugal pump, were displayed at the exhibit of that company. The Jennings Vacuum Heating Pump, with all processes carefully explained by chart was a feature of the Nash Engineering Company display.

The Strong-Scott Manufacturing Company brought to the Power Exhibition a complete exhibit of the "Unipulvo" Underfed unit pulverizer with capacity of from 1,000 to 10,000 pounds an hour. The Ingersoll-Rand Surface Condensers were exhibited from a large booth in the center of the main exhibition hall.

Westinghouse Stokers and other Westinghouse products formed an interesting exhibit as did the line of Diesel engines that formed the center of attraction of the Fairbanks-Morse exhibit. Foxboro Recording Instruments were exhibited in a complete fashion, while the Cleveland Worm Gear Company pointed out the major selling points of its products. The Kelly Company provided another attractive exhibit of genuine interest to the paper industry.

The Brown Instrument Company, The Strom Ball Bearing line, the latter with an effective black velvet background in its display along the West aisle of the Coliseum, and the Murray Iron Works also had exhibits worthy of more than ordinary mention. The Powers Regulator Company had a compact display of its temperature regulating machinery in the South Hall of the Coliseum, while the W. A. Jones Foundry and Machine Company held an advantageous location near the doorway between the Main and South Halls, exhibiting a newly perfected line of speed reducers.

Every manufacturer seemed to have greatly improved his display both from the standpoint of technical exhibition and attractiveness over that of last year. The essential selling points of each product were clearly outlined for the eye to see and those same selling points were reflected in attractive pieces of direct mail literature which were placed in the front of practically every exhibit.

UNITED WALL PAYS DIVIDENDS

HUDSON FALLS, N. Y., February 18, 1929.—At the annual meeting of stockholders of the United Wall Paper Company, of which the Standard Division of this place is one of the most important units, the customary dividends were declared from the surplus net earnings on both classes of its preferred stock. Winfield A. Huppuch is president of the company's plant in this place. The dividends are payable on March 1, 1929, to stockholders of record at the close of business on February 18, 1929, and call for the disbursement of $150,500. It is interesting to note that since the merger of the various units into the United Wall Paper Factories, Inc., on May 1, 1927, all preferred dividends have been taken care of at the stated semi-annual dates with the total disbursements to shareholders aggregating $551,833.33 which includes the dividend just declared.

The Jessup & Moore Paper Co.

PHILADELPHIA NEW YORK

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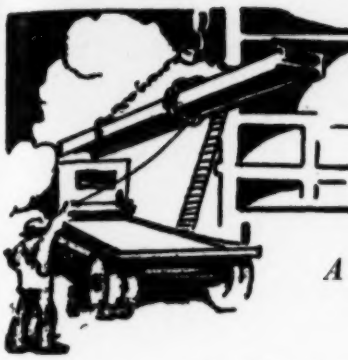

CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Finances and Operation of Paper Mills

Construction News

Beacon, N. Y.—The National Biscuit Company, 85 Ninth avenue, New York, has awarded a general contract to the John W. Cowper Company, Manufacturers' and Traders' Building, Buffalo, N. Y., for the erection of its proposed new plant at Beacon, for the manufacture of cartons and folding boxes, including printing plant, etc. The new unit will be two-story and basement, 320 x 580 feet, and will cost close to $700,000, with machinery, instead of a smaller sum, previously noted in these columns. It is expected to begin superstructure at an early date. Louis Werschung, Jr., is company architect, address noted; R. M. Shankland, 101 Park avenue, New York, is engineer.

St. Helens, Ore.—The Fir-Tex Insulating Board Company has active work in progress on its new local mill and proposes to have buildings ready for service at an early date. The plant is reported to cost more than $1,500,000, with machinery. The company has arranged for additional financing through the sale of a stock issue, to total about $500,000, a portion of the proceeds to be used in connection with mill project.

Richvale, Cal.—The Pacific Coast Pulp and Paper Company, Los Angeles, is pushing construction of its proposed new paper and pulp mill at Richvale, to be operated for the production of kraft and similar papers, using grape vine waste as source of raw material for pulp manufacture. Contract has been let to the United Engineering and Machinery Company, Chicago, for a portion of the equipment to be installed, and other awards will be made at an early date. It is understood that the mill will be ready for service late in the spring. The company is capitalized at $1,500,000. D. M. Thomas is president; Peter Swan, Lewis Building, Portland, Ore., is engineer; and C. A. Kieren, superintendent in charge of construction.

Salem, Ohio—The Church Budget Envelope Company has completed plans for the construction of a new plant on Depot street, to be one and two-story, estimated to cost about $75,000, with equipment. General contract has been awarded to the Lutz Construction Company, Canton, Ohio, and superstructure will soon begin. Melvin E. Lutz, 333 Belleflower avenue, N. W., Canton, is architect.

Monroe, La.—The Brown Paper Mill Company has engaged George F. Hardy, 309 Broadway, New York, paper mill engineer, to prepare plans for its proposed new mill unit, recently referred to in these columns, to cost about $100,000, with equipment. It is understood that no contracts have as yet been let for building work or machinery. The new plant building will be used primarily as a lime reburning unit, for reclaiming waste products. George S. Holmes is general manager.

Antioch, Cal.—The Fibreboard Products Company, San Francisco, is awarding miscellaneous contracts for its proposed new mill unit at Antioch, to be two-story, brick, steel and concrete, to be equipped primarily as a converting plant. An award for excavation has been made to R. P. Easley, Antioch, and work will be placed under way at once. General contract will be carried out by Barrett & Hilp, 918 Harrison street, San Francisco. A contract for piling has been let to the Healy-Tibbitts Construction Company, 64 Pine street, San Francisco. The company will expend about $100,000, in the project. At the same time, work will proceed on a one-story unit for storage and distributing service at Vernon, Cal., and for which a number of subcontracts for brick, lumber, etc., has been let. It will cost about $35,000, with equipment. Leland Rosener, 233 Sansome street, San Francisco, is architect for both projects. The company is a subsidiary of the Paraffine Companies, Inc., Emeryville, Cal.

Oakland, Cal.—The Pacific Paper Products Company, Tacoma, Wash., manufacturer of waxed paper specialties, is reported to have preliminary plans under advisement for the establishment of a new branch plant at Oakland, and it is expected that details will be perfected to permit early development of the project. The mill is estimated to cost close to $250,000, with machinery, and will provide about three times the present output. Leo G. Richter is president, in charge.

Manchester, Conn.—The Rogers Paper Manufacturing Company, Hartford Road, has completed the construction of a new addition to its mill, and will occupy it at once. It is located on Oakland street and will provide for increase in output.

Menominee, Mich.—The Hoskin-Morainville Paper Company, Sheridan Road, is said to have preliminary plans under way for construction of new addition, about 50 x 100 feet, to be used for increased output. Details and estimates of cost will be made at an early date. It is understood that the project will proceed early in the spring. R. W. S. Hoskin is president and general manager.

Damascus, Va.—John H. Heald & Co., Inc., Lynchburg, Va., affiliated with the Mead Paper Board Company, Dayton, Ohio, and now building a mill at Lynchburg for the production of corrugated paper board products, has concluded negotiations for the purchase of the Smethport Extract Company, Damascus, and will consolidate with its organization. The Damascus plant is devoted to the production of chestnut, oak and hemlock extracts, and will be continued by the purchasing company. The acquisition will give the Heald company three plants at Lynchburg, Radford and Damascus, respectively.

Los Angeles, Cal.—Plans are said to be maturing for a merger of a number of paper box manufacturing interests at Los Angeles and vicinity, including the Standard Paper Box Company, the Angelus Paper Box Manufacturing Company, and the Hollywood Paper Box Company. It is understood that the consolidation will be carried out under the direction of Russell, Colvin & Co., San Francisco, investment securities, and that arrangements will be perfected for increase in present output of the different units of the merger. The Los Angeles Paper Box Company and the Eureka Paper Box Company, both of Los Angeles, are said to be considering an affiliation with the new combination.

Danville, Ill.—The Cornstalk Products Company is running at full capacity for the production of paper pulp from cornstalks, with average output of about 10 tons per day. Plans are under way for an additional water supply and increased equipment to develop an output of from 30 to 40 tons per day.

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SUPREME ACHIEVEMENTS in MODERN SPECIALTIES

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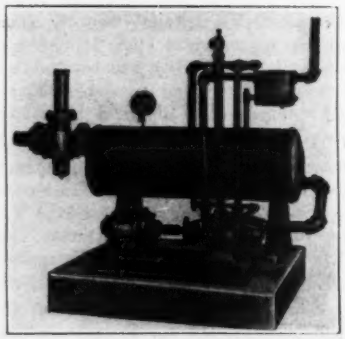

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JENNINGS HYTOR FLAT BOX UNIT
JENNINGS HYTOR DRYER EXHAUST UNIT
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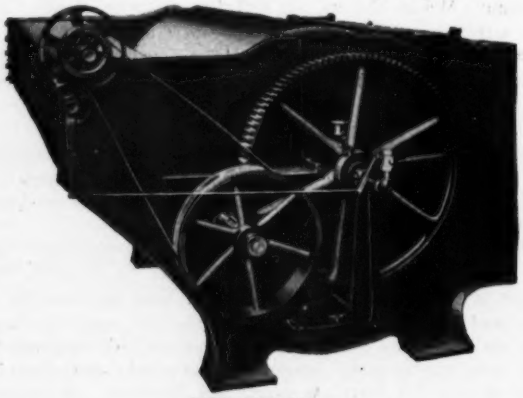
BIRD QUALITY, long known in the Trade, still predominates in the following Specialties which will be gladly shipped to any mill for trial use.

BIRD INWARD FLOW ROTARY SCREEN
BIRD SAVE-ALL — BIRD SHOWER PIPE
BIRD PULP SCREEN — BIRD THICKENER
VICKERY FELT CONDITIONER
VICKERY DOCTOR — PULMAX DRIVE



BIRD SAVE-ALL

and it is expected to proceed with the expansion at an early date. The plant was established about three months ago at a cost of more than $500,000, following considerable experimental work, and an active demand has ensued for the production. A portion of the output has recently been used at the mill of the Kalamazoo Vegetable Parchment Company, Kalamazoo, Mich.

Buckingham, Que.—The MacLaren Company, Buckingham, operating a local lumber and timber business, has broken ground for the construction of a new paper mill on adjoining site, to be used for the production of news print, including sulphate pulp division. The plant will consist of several units and will be equipped for an initial output of about 250 tons per day. It is scheduled for completion during 1930, and will represent an investment of more than $5,000,000. It is understood that company will carry out a hydroelectric power development at High Falls to supply power for the mill unit.

Trenton, N. J.—Oscar T. Smith & Son Company, Curtain avenue and Aiken street, Baltimore, Md., paper goods for bank and commercial service, has arranged for a lease of the building at 36 West State street, Trenton, aggregating about 5,000 square feet of floor space, and will establish a new branch plant at that location.

New Companies, Etc.

New York, N. Y.—Skinner & Co., Inc., has been incorporated with a capital of 1,000 shares of stock, no par value, to deal in paper goods of various kinds. The company will be represented by Ridgway, Ridgway & Slote, 41 Park Row, New York.

Chicago, Ill.—The Brown Paper Goods Company, 900 West Lake street, has filed notice of increase in capital from $150,000, to $250,000, for expansion.

New York, N. Y.—The Kappak Company has been incorporated with a capital of 100 shares of stock, no par value, to manufacture and deal in paper packing stocks and devices. The company is represented by Morris Kirschstein, 154 Nassau Street, New York.

Kalamazoo, Mich.—The Kalamazoo Paraffine Company has filed notice of increase in capital from $25,000, to $50,000, for general expansion.

Cincinnati, Ohio—The Wall Paper-Economy Chain, Inc., has been incorporated with a capital of $100,000, to operate a group of storage and distributing warehouses for wall paper service in the state. The incorporators are W. A. Ryan and C. J. Schuh, both of Cincinnati.

Milwaukee, Wis.—The Leader Card Works, Inc., has arranged for an increase in capital from $16,000, to $160,000, for general expansion in output.

Wilmington, Del.—The Ad-Tissue Corporation, care of John F. Malloy, 1900 Boulevard, Wilmington, has been incorporated with a capital of $200,000, to manufacture tissue papers and kindred paper stocks.

New York, N. Y.—The Hirsch Products Corporation has been chartered with a capital of $20,000, to manufacture and deal in paper goods of various kinds. The company is represented by Teitelbaum & Jay, 165 Broadway, attorneys.

Portland, Ore.—The Columbia River Paper Company has filed notice of increase in capital from 120,000 to 130,000 shares of stock, no par value, a portion of proceeds to be used for expansion.

AMERICAN WRITING CHANGES

[FROM OUR REGULAR CORRESPONDENT]

HOLYOKE, Mass., February 12, 1929.—Two new appointments in divisions of the American Writing Paper Company were made public last week: that of Claude Smith to be superintendent of Albion Division of the company and Thomas F. Dillon to be superintendent of the Nonotuck Division. Mr. Dillon comes from the Chemical Paper Manufacturing Company and is recognized as a skilled papermaker. Much of his time has been devoted to the manufacture of book and bond papers.

RECOMMEND ELMENDORF TEST

The Gummed Industries Association announces that it has received formal notice from the Paperboard Industries Association that they are united in their recommendation for using the Elmendorf test for arriving at standards for gummed cloth tape.

Some four years ago the Paperboard Industry Association's predecessor recommended to the tape manufacturers that they disregard the old standards used up to that time which specified a definite count and weight of grey cloth for the light and heavy gummed cambric tape.

They learned that by requiring definite construction, they obstructed progress and stood in the way of having brought to them by the manufacturers of gummed cloth tape, better and cheaper cloth tape.

Since that time, the gummed cloth tape manufactures have been experimenting and developing cloths which will have high Elmendorf tests.

The cloth is tested for strength of filler threads only, as these threads carry practically all the strain when the tape is on the box. Furthermore, it was learned that the Elmendorf gives the truest test of the cloth in comparison to the strain put on the cloth while the box is carrying goods to destination. Also, everyone in the industry was gratified to learn that by this change in recommendation the Paperboard Industries Association has been able to save thousands of dollars in their cloth tape expense.

CROWN-ZELLERBACH GET HOLDINGS

Crown-Zellerbach Corporation has announced the purchase of important timber holdings in Washington in the Cape Flattery district. The properties carry approximately 800,000,000 feet of standing timber and have been acquired as a reserve for the operations of the Port Angeles and Port Townsend mills of the company, to which they are said to be readily accessible.

The Port Angeles mill specializes in news print, thus requiring clean wood pulp, while the Port Townsend mill can take the balance for kraft production.

The acquisition of this property brings the timber holdings of the Crown-Zellerbach Corporation and its subsidiaries in the United States and Canada to more than 10,000,000,000 feet. The holdings for the most part are in the Columbia River section and tributary to the paper mills in Oregon; in the Olympic section for the Washington mills and in the Canadian section tributary to the Pacific Mills, Ltd., at Ocean Falls, B. C.

As further reserve measures the corporation has had its engineers and cruisers in the Tongas National Forest in southeastern Alaska selecting suitable timber holdings to be operated under government contract.

MACHINERY CO. GETS VERDICT

[FROM OUR REGULAR CORRESPONDENT]

CARTHAGE, N. Y., February 18, 1929.—The Improved Paper Machinery Company, of Nashua, N. H., has been granted a verdict for $1,430.62 in its contract action brought against the West End Paper Company of this place. Justice E. Smith presided at the trial which ended in favor of the plaintiff. The plaintiff firm brought action to recover $1,250, the remaining payment on a machine purchased by the defendant in 1926. Defendants brought a counterclaim for the $1,250 paid, declaring the machine was not as represented.

RANIER INSTALLS STEAM UNIT

The Ranier Pulp and Paper Company is installing a new steam unit in its plant at Shelton, Wash., which it is thought will be completed about April 1. Later other additions to the plant are contemplated to increase production materially at a relatively small outlay. In the month of January this company exceeded all previous tonnage despite adverse weather conditions which closed down logging operations.

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Machine, Water Finish, Supercald and Embossed
SPECIALTIES OF ALL KINDS

White and Laid for Candy Bags Colors for Tea and Coffee Bags—Also Strong Bag Linings

Bond, Drug, Waxing, Manifold Strong White Wrappings of all kinds for the various trades

"If Better Papers Could be Made We Would Make Them"
"HERCULES BRANDS" Standard High Quality since 1825
Largest Specialty Mill—Up to date Equipment and Prompt Service

Main Office & Mills
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McDOWELL PAPER MILLS

Samples and Quotations on application

PAPER AND PAPER STOCK IMPORTS AND EXPORTS OF THE UNITED STATES

For the Month Ending December 31, and for the Twelve Months Ending December 31, 1928 as Compared with Corresponding Months of Previous Year

	December				Twelve Months Ending December 31			
	1927		1928		1927		1928	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
IMPORTS—PAPER								
Paper and Manufactures (total)	.....	$13,271,863	.....	$14,459,838	.....	$149,365,343	.....	$156,384,548
Printing paper—								
Standard news print...lbs...free	361,339,549	11,862,751	415,453,542	13,089,568	3,974,129,203	131,488,784	4,313,732,865	139,410,918
Imported from—								
Finland...lbs.	3,632,767	109,676	9,239,495	239,195	59,053,098	1,678,152	80,478,655	2,080,710
Germany...lbs.	1,343,412	39,604	1,456,710	46,389	13,986,611	437,868	18,333,284	499,926
Norway...lbs.	4,840,398	130,126	2,636,622	67,146	33,595,321	909,028	21,728,251	583,476
Sweden...lbs.	13,601,265	371,246	9,445,978	253,687	135,729,041	3,857,801	111,438,867	2,949,230
Canada...lbs.	310,608,902	10,326,770	360,000,268	11,503,918	3,551,504,615	118,731,001	3,852,695,242	126,151,545
Newfoundland and Labrador...lbs.	27,184,939	881,294	32,674,469	979,233	178,501,964	5,820,991	228,343,968	7,124,171
Other countries...lbs.	127,866	4,035	.....	.....	1,758,553	53,943	714,598	21,860
All other, n. e. s...lbs...dut.	585,663	26,821	665,068	30,135	10,420,368	512,122	7,339,078	342,991
Grease-proof and waterproof papers...lbs...dut.	138,139	21,095	62,451	11,564	1,622,421	262,355	1,261,844	231,621
Kraft wrapping paper...lbs...dut.	1,851,222	77,742	949,956	40,197	12,197,887	517,951	10,762,437	460,294
All other wrapping paper...lbs...dut.	2,922,563	61,508	1,121,324	30,339	12,913,960	336,885	16,226,865	392,349
Writing, letter, drawing, etc., papers...lbs...dut.	258,790	67,228	269,126	57,325	3,418,833	885,393	3,107,574	806,502
Surface-coated paper...lbs...dut.	156,133	72,149	210,324	86,454	2,234,701	912,285	2,370,859	1,103,611
Tissue, copying, etc., papers...lbs...dut.	345,626	200,589	330,600	180,337	3,231,208	1,836,277	3,569,369	2,052,868
Paper boards, n. e. s.—								
Pulp boards in rolls...lbs...dut.	4,914,018	108,396	4,196,808	89,842	60,127,790	1,423,111	54,315,525	1,185,858
Paper boards, pulp board, and card board...lbs...dut.	}		1,161,919	29,646	}		19,560,531	435,399
Leather board, test, and wall board...lbs...dut.	2,243,597	50,714	87,247	4,440	.....	827,285	880,051	27,434
Cigarette paper, cigarette books, and covers...lbs...dut.	894,564	246,504	1,001,691	321,495	14,685,107	4,291,637	11,689,018	3,213,981
Hanging paper (wall paper)...lbs...dut.	334,346	76,479	288,719	60,481	2,356,424	633,890	2,164,176	657,163
Duplex decalcomania paper, not printed...lbs...free	33,415	7,619	15,921	3,768	701,709	158,586	626,467	141,704
Paper boxes...lbs...dut.	242,044	128,793	214,577	135,071	2,503,330	1,446,551	2,804,320	1,789,421
Pulp or papier mâché and manufactures, n. e. s...dut.	.....	32,012	.....	43,672	.....	338,749	.....	435,633
All other paper and manufactures...dut.	.....	231,463	.....	245,504	.....	3,493,482	.....	3,696,801
WOOD PULP								
Mechanically ground wood pulp...tons...free	22,300	556,158	24,260	585,274	219,285	5,961,821	222,499	5,443,495
Sulphite wood pulp...tons	95,201	5,626,981	100,867	5,880,818	924,986	58,487,471	948,431	55,955,555
Unbleached...tons...free	71,267	3,829,365	71,910	3,692,275	613,856	34,262,845	640,660	32,587,134
Bleached...tons...free	23,934	1,797,616	28,957	2,188,543	311,130	24,224,626	307,711	23,268,424
Imported from—								
Finland...tons	9,827	430,934	8,633	398,833	74,701	3,781,986	94,278	4,157,042
Germany...tons	5,771	396,419	6,764	453,240	50,828	3,589,647	63,525	4,231,959
Norway...tons	3,357	217,236	6,414	387,815	67,675	5,020,809	63,668	4,230,090
Sweden...tons	41,473	2,404,438	44,630	2,471,581	346,244	20,607,401	333,367	18,451,565
Canada...tons	32,308	2,057,604	31,753	1,998,660	350,910	23,397,895	356,558	22,805,358
Other countries...tons	2,465	120,350	2,673	170,689	34,628	2,089,733	37,035	2,079,544
Sulphate wood pulp, unbleached (kraft pulp)...tons...free	41,099	2,283,561	59,444	3,222,447	341,162	20,684,298	381,256	21,170,948
Imported from—								
Finland...tons	1,096	44,972	5,000	235,173	14,069	718,894	28,843	1,301,769
Norway...tons	1,056	51,796	2,625	135,194	10,334	576,094	15,214	824,491
Sweden...tons	26,525	1,397,629	37,975	2,023,957	176,444	10,262,487	193,145	10,136,956
Canada...tons	12,109	774,439	13,172	796,221	138,660	9,029,923	139,945	8,718,018
Other countries...tons	313	14,725	672	31,902	1,655	96,900	4,109	189,714
Sulphate wood pulp, bleached...tons...free	96	5,990	2,178	126,692	10,789	708,712	14,590	894,587
Other pulp...tons...free	71	7,548	309	23,142	3,348	243,968	6,728	455,190
CRUDE PAPER STOCK								
Rags for paper stock...lbs...free	36,289,214	619,645	32,752,543	693,980	388,121,400	7,646,864	439,892,896	8,195,224
Waste bagging, waste paper, etc...lbs...free	11,444,868	140,751	11,931,830	137,488	108,793,425	1,429,424	148,756,214	1,957,937
Old rope and all other paper stock...lbs...free	5,599,729	188,773	8,606,368	267,000	64,977,715	1,985,313	70,723,965	2,065,267
CHEMICALS AND OTHER PAPER MAKERS' MATERIALS								
Colors, dyes, stains, color acids, and color bases, n. e. s...lbs...dut.	357,524	449,771	779,507	839,392	5,496,833	6,181,795	6,252,157	6,876,606
Imported from—								
Belgium...lbs.	10,653	14,979	7,658	8,965	180,124	242,419	114,977	136,966
France...lbs.	65,717	72,391	10,083	9,968	234,996	274,154	74,284	89,991
Germany...lbs.	147,725	164,274	581,617	616,610	3,238,040	3,426,848	4,055,619	4,249,849
Italy...lbs.	17,046	21,522	6,824	5,286	112,475	130,503	64,954	60,103
Switzerland...lbs.	103,733	162,047	118,660	138,771	1,493,466	1,869,124	1,638,662	2,004,560
United Kingdom...lbs.	6,540	6,130	5,896	9,167	146,270	147,640	98,027	95,507
Other countries...lbs.	6,110	8,428	48,769	50,625	91,462	91,107	205,634	239,630
Casein or lactarene...lbs...dut.	958,871	134,185	1,934,747	225,823	24,209,504	3,119,668	28,651,215	3,677,941
Kaolin, china, and paper clay...tons...dut.	28,106	271,009	36,557	433,988	302,693	2,937,423	274,472	2,963,055

(Continued on page 319)

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OLD AND NEW COTTON AND LINEN RAGS
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U. S. Patent granted in 1843 to J. M. & L. Hollingsworth for process of making paper from Manila Fibre.

PAPER AND PAPER STOCK IMPORTS AND EXPORTS OF THE UNITED STATES

(Continued from page 317)

EXPORTS—PAPER

	December 1927 Quantity	December 1927 Value	December 1928 Quantity	December 1928 Value	Twelve Months Ending December 31 1927 Quantity	Twelve Months Ending December 31 1927 Value	Twelve Months Ending December 31 1928 Quantity	Twelve Months Ending December 31 1928 Value
Paper and Manufactures (total)	.....	2,231,440	.....	2,697,188	.....	$26,945,746	.....	$30,932,651
Printing paper—								
News print paper ....lbs.	1,070,214	65,095	1,326,424	52,374	24,657,313	1,191,033	22,780,530	866,046
Exported to—								
Canada ....lbs.	406,174	25,959	49,575	2,526	3,373,085	211,805	244,531	10,631
Central America ....lbs.	85,106	3,942	115,524	4,228	805,324	39,803	1,230,552	43,538
Cuba ....lbs.	234,190	13,470	216,726	7,284	4,616,006	217,306	3,799,523	139,563
South America ....lbs.	254,505	16,076	258,765	9,969	5,955,234	263,590	5,578,769	214,163
China, Hong Kong, and Kwantung...lbs.	.....	.....	422,485	18,028	382,793	23,133	3,026,788	112,844
Philippine Islands ....lbs.	14,190	1,488	198,189	7,650	7,287,869	307,550	7,491,651	292,070
Other countries ....lbs.	76,049	4,160	65,160	2,689	2,237,002	127,846	1,408,716	53,237
Book paper, not coated ....lbs.	1,609,337	119,575	2,715,024	188,727	16,044,863	1,370,932	24,509,919	1,789,604
Exported to—								
Europe ....lbs.	222,515	17,746	82,325	6,294	1,592,576	136,969	609,284	61,460
Canada ....lbs.	74,173	10,357	1,401,679	77,254	3,648,460	296,823	9,337,049	557,274
Mexico ....lbs.	34,724	4,529	32,656	3,548	511,502	55,070	510,567	56,696
Cuba ....lbs.	399,061	28,432	422,778	30,619	2,855,960	240,201	4,832,844	351,493
Argentina ....lbs.	117,564	8,457	138,723	10,569	928,095	74,085	658,671	58,792
Other South America....lbs.	105,239	8,981	120,143	12,453	1,796,195	154,155	1,251,749	107,368
China, Hong Kong, and Kwantung...lbs.	5,731	276	46,318	5,253	391,806	43,803	1,849,236	150,264
Philippine Islands ....lbs.	422,294	23,951	225,516	14,623	2,215,185	162,893	2,666,852	174,607
Australia ....lbs.	115,753	6,850	158,628	20,442	910,116	92,495	1,047,264	127,319
Other countries ....lbs.	112,283	9,996	86,258	7,672	1,194,968	114,738	1,746,403	144,331
Cover paper ....lbs.	116,047	20,776	168,335	29,288	1,651,343	283,083	2,037,523	340,972
Grease-proof and waterproof paper....lbs.	128,949	24,321	223,658	38,072	2,613,479	380,647	3,107,467	489,647
Wrapping paper ....lbs.	3,486,925	213,587	3,548,381	237,779	32,312,413	2,256,059	36,757,253	2,586,848
Surface-coated paper ....lbs.	408,116	61,600	1,364,776	122,245	5,973,265	768,132	11,156,835	1,137,134
Tissue and crepe paper....lbs.	521,488	110,470	363,595	82,833	4,801,391	1,091,531	4,995,465	1,096,324
Toilet paper ....lbs.	587,243	67,282	520,929	56,972	5,527,862	668,871	6,447,953	685,478
Paper towels and napkins....lbs.	180,034	29,083	268,302	36,150	2,360,487	331,700	3,018,379	399,910
Box board ....lbs.	2,764,525	83,771	2,456,331	64,761	43,633,581	1,351,016	48,669,581	1,353,561
Bristols and bristol board....lbs.	167,002	20,077	253,548	23,857	1,844,590	180,136	1,979,152	220,966
Other paper board and straw board....lbs.	2,430,660	123,597	2,748,448	144,879	38,554,831	2,072,702	42,124,168	2,149,565
Sheathing and building paper....lbs.	1,192,953	42,981	1,611,842	57,785	12,801,935	502,826	14,844,482	550,679
Wall board of paper or pulp....sq. ft.	3,532,864	117,575	6,192,164	201,864	45,908,732	1,506,412	61,539,772	2,068,788
Blotting paper ....lbs.	472,370	51,398	292,983	34,350	3,666,789	411,410	3,920,957	445,510
Filing folders, index cards, and other office forms ....lbs.	80,048	37,204	86,479	38,231	1,036,011	321,976	1,502,400	516,123
Papeteries (fancy writing paper)....lbs.	25,620	8,398	32,917	10,138	705,844	185,951	752,040	196,079
Other writing paper....lbs.	1,607,681	205,043	2,686,303	255,383	13,228,375	1,918,051	25,833,846	2,832,934
Paper hangings (wall paper)....yds.	3,032,987	48,220	2,093,030	34,906	29,390,465	603,434	33,950,960	641,570
Paper bags ....lbs.	854,795	75,293	939,214	76,401	11,246,849	971,420	9,155,249	801,027
Boxes and cartons....lbs.	1,777,112	144,890	2,410,382	151,520	23,659,020	1,627,954	28,434,923	1,899,446
Envelopes ....lbs.	216,234	38,160	189,581	34,487	2,508,919	422,616	2,453,119	405,505
Vulcanized fiber sheets, strips, rods, and tubes.lbs.	366,913	101,727	501,369	153,631	4,285,038	1,264,366	5,523,712	1,455,175
Manufactures of vulcanized and indurated fiber.lbs.	50,729	7,579	35,785	7,912	523,519	148,928	486,809	137,811
Cash-register and adding-machine paper....lbs.	145,368	14,973	271,475	29,141	2,103,534	212,561	3,419,258	359,140
Other paper and paper products....lbs.	.....	398,765	.....	533,492	.....	4,901,999	.....	5,506,809
WOOD PULP AND PAPER STOCK								
Sulphite wood pulp ....tons	3,022	134,906	3,220	212,530	24,252	1,265,859	22,272	1,308,459
Soda wood pulp ....tons	22	1,481	140	11,374	2,027	176,507	2,441	194,325
Other wood pulp....tons	150	5,113	742	45,652	2,298	91,264	5,183	276,395
Rags and other paper stock....lbs.	19,231,415	408,631	18,752,376	266,688	217,798,068	3,393,998	230,627,040	4,103,288
PAPER AND PULP MILL MACHINERY								
Paper and pulp mill machinery....lbs.	2,334,281	332,308	650,540	207,044	20,100,140	3,822,893	14,060,785	3,066,942

TO REPRESENT NOBLE & WOOD

The Noble & Wood Machine Company, Hoosick Falls, N. Y., has appointed Henry M. Ford as sole agent and sales engineer for the States of California, Oregon, Washington, British Columbia and Alaska. The Noble & Wood Machine Company is desirous of establishing and maintaining close contact with the Pacific Coast mills and making more easily available to them the services of the company's improved lines of beaters, jordans and other paper making equipment.

Mr. Ford has been associated with the paper industry for a number of years, starting as engineer for the Nekoosa-Edwards Paper Company, Port Edwards, Wis. He has since been employed by several consulting engineering firms to design and supervise pulp and paper mill plants and improvements.

Mr. Ford will make his headquarters in Portland, Ore., and will be available to all Coast mills on very short notice. It is hoped that the growing paper mills on the Pacific Coast will feel free to call on him when they are considering expansion or improvements or when they have any problem concerning the preparation of their stock. The Noble & Wood Machine Company has developed several remarkable innovations in equipment and methods for the more efficient preliminary preparation of stock and Mr. Ford has some interesting data on these new developments and their installation in representative mills.

CONSOLIDATED HAS GOOD YEAR

[FROM OUR REGULAR CORRESPONDENT]

KALAMAZOO, Mich., February 18, 1929.—The Consolidated Paper Company, Monroe, showed a net profit of $920,977.52 for 1928, after all deductions. This is equivalent after the payment of 7 per cent preferred dividends of $145,626.85, to $1.03 a share on the 750,000 shares of common stock outstanding.

Common dividends on the basis of nine per cent were paid during the year 1928.

President E. C. Rauch reports that plant additions and improvements during the past year resulted in an expenditure of $594,294. Warehouses that will carry 10,000 tons of paper stock are planned for the immediate future.

As of December, 1928, current assets were $3,010,023 and current liabilities, $896,794. Gross assets were $12,044,439. Patents and good will are carried at $1.

HANS LAGERLOEF
President & Treasurer
ORVAR HYLIN
Vice President
MAURICE LONDON
Secretary

Telephones
MURRAY HILL 4246-4247

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FINLAND

600,000 TONS PRODUCTION CHEMICAL

PULPS

MECHANICAL PRODUCTION 300,000 TONS

Monthly Shipments Winter and Summer—All Ports

Imports of Paper and Paper Stock

NEW YORK, BOSTON, PHILADELPHIA AND OTHER PORTS

NEW YORK IMPORTS

WEEK ENDING FEBRUARY 16, 1929.

SUMMARY

Cigarette paper	141 cs.
Wall paper	268 bls., 26 cs.
Paper hangings	29 bls., 20 cs.
News print	1127 rolls
Printing paper	181 bls., 358 cs.
Wrapping paper	5 bls., 55 cs.
Packing paper	44 cs.
Drawing paper	41 cs.
Filter paper	18 cs.
Cover paper	5 cs.
Tissue paper	54 cs.
Colored paper	87 cs.
Photo paper	2 cs.
Coated paper	56 cs.
Surface coated paper	25 cs.
Baryta coated paper	25 cs.
Gold coated paper	8 cs.
Decalcomania paper	31 cs.
Aluminum paper	5 cs.
Basic paper	51 cs.
Copying paper	1 cs.
Gummed paper	6 cs.
Stencil paper and ink	83 cs.
Miscellaneous paper	42 bls., 241 cs.

CIGARETTE PAPER

British American Tobacco Co., Mauretania, Southampton, 41 cs.
P. Lorillard Co., Patria, Marseilles, 100 cs.

WALL PAPER

W. H. S. Lloyd & Co., Nortonian, London, 1 cs., 6 bls.
D. C. Andrews & Co., Deutschland, Hamburg, 1 cs.
Bendix Paper Co., Deutschland, Hamburg, 4 cs.
F. J. Emmerich, Deutschland, Hamburg, 1 cs., 157 bls.
Globe Shipping Co., Deutschland, Hamburg, 61 bls.
American Exchange Irving Trust Co., Deutschland, Hamburg, 16 cs.
W. H. S. Lloyd & Co., Antonia, Liverpool, 1 cs.
W. H. S. Lloyd & Co., Megantic, Liverpool, 2 cs., 5 bls.
F. J. Emmerich, Megantic, Liverpool, 7 bls.
F. J. Emmerich, Albertic, Liverpool, 32 bls., 2 cs.

PAPER HANGINGS

W. H. S. Lloyd & Co., American Trader, London, 21 bls., 4 cs.
A. C. Dodman, Jr., Inc., Albertic, Liverpool, 2 bls., 3 cs.
A. C. Dodman, Jr., Inc., Antonia, Liverpool, 6 bls.
Whiting & Patterson Co., Inc., Mauretania, Southampton, 13 cs.

NEWS PRINT

F. Henjes, Jr., Deutschland, Hamburg, 66 rolls.
Perkins Goodwin & Co., Deutschland, Hamburg, 464 rolls.
Parsons & Whittemore, Inc., Muenchen, Bremen, 597 rolls.

PRINTING PAPER

Acme Letter File Co., Ida, Trieste, 7 cs.
Sinclair Valentine Co., Deutschland, Hamburg, 7 cs.
Keuffel & Esser Co., Deutschland, Hamburg, 92 cs.
E. Dietzgen & Co., Deutschland, Hamburg, 17 cs.
E. Dietzgen & Co., Maasdem, Rotterdam, 38 cs.
J. L. Bernitz, France Maru, Hamburg, 62 bls., 119 bls.
P. C. Zuhlke, Nessian, Antwerp, 197 cs.

WRAPPING PAPER

Satisfaction Supply Co., Inc., Lepanto, Antwerp, 5 bls.
Birn & Wachenheim, Nessian, Antwerp, 55 cs.

PACKING PAPER

Haule Wax Paper Manfg. Co., Deutschland, Hamburg, 29 cs.
International F'd'g Co., Deutschland, Hamburg, 15 cs.

DRAWING PAPER

Keuffel & Esser Co., Deutschland, Hamburg, 40 cs.
H. Reeve Angel & Co., Inc., Megantic, Liverpool, 1 cs.

FILTER PAPER

H. Reeve Angel & Co., Inc., Megantic, Liverpool, 18 cs.

COVER PAPER

International F'd'g Co., Deutschland, Hamburg, 5 cs.

TISSUE PAPER

Old Master Paper & Pulp Corp., Deutschland, Hamburg, 51 cs.
Parsons & Whittemore, Inc., Antonia, Liverpool, 1 cs.
F. C. Strype, Antonia, Liverpool, 2 cs.

COLORED PAPER

Universal Car Loading Co., Muenchen, Bremen, 7 cs.
S. Gilbert, Muenchen, Bremen, 28 cs.
Tamm & Co., Muenchen, Bremen, 14 cs.
E. Dietzgen & Co., France Maru, Hamburg, 38 cs.

PHOTO PAPER

Guaranty Trust Co., Deutschland, Hamburg, 2 cs.

COATED PAPER

Globe Shipping Co., Deutschland, Hamburg, 4 cs.
P. C. Zuhlke, Nessian, Antwerp, 18 cs.
Gevaert Co. of America, Nessian, Antwerp, 34 cs.

SURFACE COATED PAPER

Quality Art Novelty Co., Deutschland, Hamburg, 4 cs.
Phoenix Shipping Co., Deutschland, Hamburg, 5 cs.
Globe Shipping Co., Maasdam, Rotterdam, 16 cs.

BARYTA COATED PAPER

Globe Shipping Co., Muenchen, Bremen, 25 cs.

GOLD COATED PAPER

F. Murray Hill, Muenchen, Bremen, 8 cs.

DECALCOMANIA PAPER

C. W. Sellers, Deutschland, Hamburg, 30 cs.
Hensel Bruckman & Lorbacher, Muenchen, Bremen, 1 cs.

ALUMINUM PAPER

Catty Foil Co., Megantic, Liverpool, 5 cs.

BASIC PAPER

American Express Co., Nessian, Manchester, 51 cs.

COPYING PAPER

E. Dietzgen & Co., Antonia, Liverpool, 1 cs.

GUMMED PAPER

Happel & McAvoy, Deutschland, Hamburg, 6 cs.

STENCIL PAPER AND INK

Arlac Dry Stencil Co., Deutschland, Hamburg, 83 cs.

MISCELLANEOUS PAPER

Japan Paper Co., Bellbuckle, Havre, 19 cs.
Japan Paper Co., Augustus, Genoa, 25 cs.
Steiner Paper Corp., Maasdam, Rotterdam, 49 cs.
J. Beckhard, Maasdam, Rotterdam, 7 cs.
Heemsoth Basse & Co., Maasdam, Rotterdam, 31 bls.
Globe Shipping Co., Paris, Havre, 2 cs.
Liggett & Myers Tobacco Co., Paris, Havre, 139 cs.
Walker Goulard Plehn Co., France Maru, Hamburg, 11 bls.

RAGS, BAGGINGS, ETC.

Chase National Bank, Ammon, Hamburg, 854 bls. rags.
Amtorg Trading Co., Ammon, Hamburg, 638 bls. rags; 28 bls. flax waste.
National City Bank, Nortonian, London, 16 bls. rags.
Brown Bros. & Co., Nortonian, London, 30 bls. rags.
Darmstadt Scott & Courtney, Bellbuckle, Havre, 130 bls. bagging
B. D. Kaplan, Bellbuckle, Havre, 5 bls. rags.
E. Mayer, Bellbuckle, Havre, 7 bls. rags.
Glaser Jaffe Woolstock Co., Bellbuckle, Havre, 11 bls. rags.
Banco Com'l Italiane Trust Co., Talisman, Genoa, 162 bls. bagging.
I. Abela, Ida, Malta, 45 bls. rags.
A. W. Fenton, London Exchange, Dundee, 51 bls. bagging.
Castle & Overton, Inc., London Exchange, Dundee, 21 bls. threads.
Manufacturers Trust Co., Muenchen, Bremen, 5 bls. rags.
Bankers Trust Co., Muenchen, Bremen, 5 bls. rags.
American Irving Trust Co., Muenchen, Bremen, 17 bls. rags.
A. W. Fenton, Muenchen, Bremen, 120 bls. rags.
Van Oppen & Co., Muenchen, Bremen, 46 bls. rags.
A. W. Fenton, Maasdam, Rotterdam, 18 bls. rags.
E. J. Keller Co., Inc., Maasdam, ——, 187 bls. rags.
W. Schall & Co., Megantic, Liverpool, 215 bls. paper stock.
J. Cohen & Son, Albertic, Liverpool, 78 bls. rags.
Castle & Overton, Inc., Albertic, Liverpool, 66 bls. rags.
C. R. Spence & Co., Chicago City, Bristol, 110 bls. rags.
E. J. Keller Co., Inc., France Maru, ——, 94 bls. rags.
Castle & Overton, Inc., France Maru, Hamburg, 60 bls. rags.
W. Schall & Co., Cabo Espartel, Valencia, 154 bls. rags.
Bank of The Manhattan Co., Livenza, Messina, 54 bls. rags.
A. W. Fenton, Lepanto, Hull, 174 bls. rags.
Castle & Overton, Inc., Lepanto, Hull, 106 bls. bagging.
Johns Manville Co., Lepanto, Hull, 68 bls. bagging.
Bankers Trust Co., Lepanto, Hull, 10 bls. rags.
Katzenstein & Keene, Inc., Lepanto, Antwerp, 309 bls. rags.
Amsinck Sonne & Co., Inc., Lepanto, Antwerp, 70 bls. flax waste.
Stone Berman Corp., Lepanto, Antwerp, 21 bls. rags.
Whaling Waste Products Corp., Lepanto, Antwerp, 126 bls. bagging.
Royal Manfg. Co., Lepanto, Antwerp, 73 bls. cotton waste.
Darmstadt Scott & Courtney, Lepanto, Antwerp, 20 bls. thread waste.
E. J. Keller Co., Inc., Lepanto, ——, 27 bls. flax waste.
Castle & Overton, Inc., Clairton, England, 5 bls. rags.
Castle & Overton, Inc., City of Singapore, India, 22 bls. rags.

OLD ROPE

Brown Bros. & Co., Mercier, Antwerp, 53 coils.
Brown Bros. & Co., Ammon, Hamburg, 42 coils.
Brown Bros. & Co., Maasdam, Rotterdam, 59 coils.
Brown Bros. & Co., Megantic, Liverpool, 94 coils.
Brown Bros. & Co., Alfonso XIII, Coruna, 36 bales.
Brown Bros. & Co., Chicago City, Bristol, 137 coils.
Brown Bros. & Co., Cabo Espartel, Huelva, 287 rolls, 33 bls.
Brown Bros. & Co., Lepanto, Hull, 174 coils.
Schall & Co., Patria, Harseilles, 68 coils.

CASEIN

Atterbury Bros., Inc., American Legion, Buenos Aires, 2,418 bags.
Kalbfleisch Corp., American Legion, Buenos Aires, 2,500 bags.
T. M. Duche & Sons, American Legion, Buenos Aires, 834 bags.
Casein Manufacturing Co., American Legion, Buenos Aires, 321 bags.

CHINA CLAY

C. T. Wilson & Co., Chicago City, Bristol, 125 casks.
L. A. Salomon & Bro., Chicago City, Bristol, 75 casks.

WOOD PULP

Bulkley Dunton & Co., Tampa, ——, 5,375 bls. sulphite; 1,300 bls. sulphate.
Bulkley Dunton & Co., Malaren, ——, 2,534 bls. wood pulp.
Price & Pierce, Ltd., Malaren, Gothenburg, 1,500 bls. wood pulp.
Farmers Loan & Trust Co., Fred. VIII, Oslo, 800 bls. wood pulp, 100 tons.
Scandinavian Pulp Agency, Inc., Tampa, Sweden, 375 bls. sulphite.
M. Gottesman & Co., Inc., Tampa, Sweden, 250 bls. sulphate.
American Exchange Irving Trust Co., Deutschland, Hamburg, 508 bls. wood pulp, 103 tons.
Castle & Overton, Inc., Maasdam, Rotterdam, 676 bls. wood pulp.

WOOD FLOUR

A. Kramer & Co., Maasdam, Rotterdam, 400 bags.

WOOD PULP WADDING

Birn & Wachenheim, Maasdam, Rotterdam, 75 bls.

WOOD PULP BOARDS

Lagerloef Trading Co., Ammon, Hamburg, 276 rolls, 57 tons.

PHILADELPHIA IMPORTS

WEEK ENDING FEBRUARY 16, 1929.

Guaranty Trust Co., Express, Genoa, 204 bls. rags.
V. Galaup, Express, Naples, 253 bls. rags.
J. B. Moors & Co., Chicago City, Bristol, 217 bls. rags; 20 bls. waste paper.
J. A. Steer & Co., Chicago City, Bristol, 66 coils old rope.
A. J. Holman & Co., Livenza, Genoa, 24 cs. paper.

(Continued on page 323)

William D. Judd
President

Courtlandt B. Griffin
Vice President

George E. Bardwell
Treasurer

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Incorporated 1848

South Hadley Falls, Mass.

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Kraft Paper, Towels, Bleached and Unbleached Sulphite Papers

Malone Paper Co., Malone, N. Y.

Railroad Writing, Wrapping, Envelope and Waxing Manila

American Representatives:

J. R. Booth, Ltd., Ottawa, Ont.

News Print

Imports of Paper and Paper Stock

(Continued from page 321)

National City Bank, Livenza, Palermo, 163 bls. rags.
E. J. Keller Co., Inc., Chickasaw, ——, 54 bls. bagging.
Castle & Overton, Inc., Porta, Germany, 200 bls. rags.
Castle & Overton, Inc., Coahoma City, Belgium, 165 bls. rags.
Castle & Overton, Inc., Chickasaw, Ireland, 24 bls. rags.
Castle & Overton, Inc., Lorain, Germany, 162 bls. rags.
Castle & Overton, Inc., London Mariner, England, 109 bls. rags.
Castle & Overton, Inc., Hagen, Germany, 7,172 bls. wood pulp.

BALTIMORE IMPORTS

WEEK ENDING FEBRUARY 16, 1929.

Congoleum Nairn Co., Bellbuckle, Dunkirk, 160 bls. rags.
S. Shapiro, Bellbuckle, Dunkirk, 135 bls. rags.
Congoleum Nairn Co., Express, Leghorn, 309 bls. rags.

BOSTON IMPORTS

WEEK ENDING FEBRUARY 16, 1929.

First National Bank of Boston, Bonheur, Buenos Aires, 501 bags casein.
J. L. Fairbanks Co., Nortonian, London, 2 cs. writing paper.
Brown Bros. & Co., Nortonian, London, 329 coils, 24 bls. old rope; 110 bls. waste paper.
Baring Bros. & Co., Ltd., Nortonian, London, 258 bls. waste paper.
Crocker Burbank Co., Nortonian, London, 802 bls. waste paper.
Southworth Co., Nortonian, London, 50 bls. rags.
Castle & Overton, Inc., Eastern Planet, Germany, 102 bls. rags.
Castle & Overton, Inc., Burgerdyk, Holland, 60 bls. rags; 720 bls. wood pulp.
E. J. Keller Co., Inc., Burgerdyk, ——, 190 bls. rags.

COTY MACHINE CO. BUSY

[FROM OUR REGULAR CORRESPONDENT]

WATERTOWN, N. Y., February 18, 1929.—Expansion of the Coty Machine Company, manufacturers of paper bag machinery, is now under way and officials of the company look forward to the best year in their history. The company is being deluged with orders for its new high speed rotary sack machines and just now the greatest problem is to speed up production in order to have orders out on scheduled time. During the past few weeks additional orders have been received from the Adams Bag Company, International Paper Company, Valve Bag Company, Bates Valve Bag Corporation, and the Thomas Phillips Company. In order to produce the required machinery on scheduled time it has been necessary to enlarge the facilities of the firm's plant on West Main street, where the assembling is done, and to enlist the services of several other local machine shops. A great deal of time has also been saved by the purchase of standard parts, such as pulleys, gears and bushings from large companies specializing in such work.

The company now contemplates the utilization of the services of local machine shops to a greater extent than before including the New York Air Brake Company, Bagley & Sewall Company, Massey Machine Company, Lawrence & Hill, and several others. The New York Air Brake Company will continue to supply all patterns and castings as they have been doing for the past several years while the assembly shop of the Coty Company will operate nights as has been the custom for some time. While many of the orders already booked are for standard machines at least half of them are for the newly developed machinery for making multi-wall valve bags for cement, lime and plaster. It is claimed by officials that the company is the only one in the world now producing the type of machinery for making this pasted valve bag and inquiries are coming in every day from both domestic and foreign companies which have been searching for efficient equipment to make such a bag. The companies ordering this machinery have informed officials of the local company that they are ordering the machinery after extensive tests have proven to their complete satisfaction that pasted bags are superior to sewed bags as it is claimed they have a higher drop test, are better appearing, and their manufacture with the new equipment is far simpler, faster and requires far less labor and capital invested in machinery.

The firms ordering the new equipment predict that the pasted multi-wall valve bags will almost entirely displace the sewed multi-wall valve bags within a relatively short time and claim that the market has been calling steadily and insistently for a less expensive bag.

JANUARY NEWS PRINT STATISTICS

Production of news print in Canada during January, 1929, according to the News Print Service Bureau, amounted to 212,191 tons and shipments to 209,020 tons. Production in the United States was 123,822 tons and shipments 120,263 tons, making a total United States and Canadian news print production of 336,013 tons and shipments of 329,283 tons. During January, 20,648 tons of news print were made in Newfoundland and 1,882 tons in Mexico, so that the total North American production for the month amounted to 358,543 tons.

The Canadian mills produced 24,342 tons more in January, 1929, than in January, 1928, which was an increase of 13 per cent. The United States output was 4,297 tons, or 4 per cent more than in January, 1928; in Newfoundland 2,709 tons, or 15 per cent more, and in Mexico 714 tons more, making a total increase of 32,062 tons, or 10 per cent over January, 1928.

During January the Canadian mills operated at 81.9 per cent of rated capacity, United States mills at 81.8 per cent and Newfoundland mills at 100.8 per cent. Stock of news print paper at Canadian mills totalled 21,406 tons at the end of January and at United States mills 38,003 tons, making a combined total of 59,409 tons, which was equivalent to 3.8 days' average production.

ACQUIRES BOX PLANT

LONGVIEW, Wash., February 14, 1929.—The Longview Fiber Company has acquired by merger the assets and business of the General Fiber Box Company, Springfield, Mass., according to word received from H. L. Wollenberg, president of the former company who is in the East. Clarence J. Schoo, president of the General Fiber Box Company, has become vice-president and director of the Longview Fiber Company, according to the announcement.

The Longview Fiber Company operates a $3,000,000 mill in Longview, and the General Fiber Box Company, making a line of corrugated boxes, has been one of the customers of the western concern.

IN LARGER QUARTERS

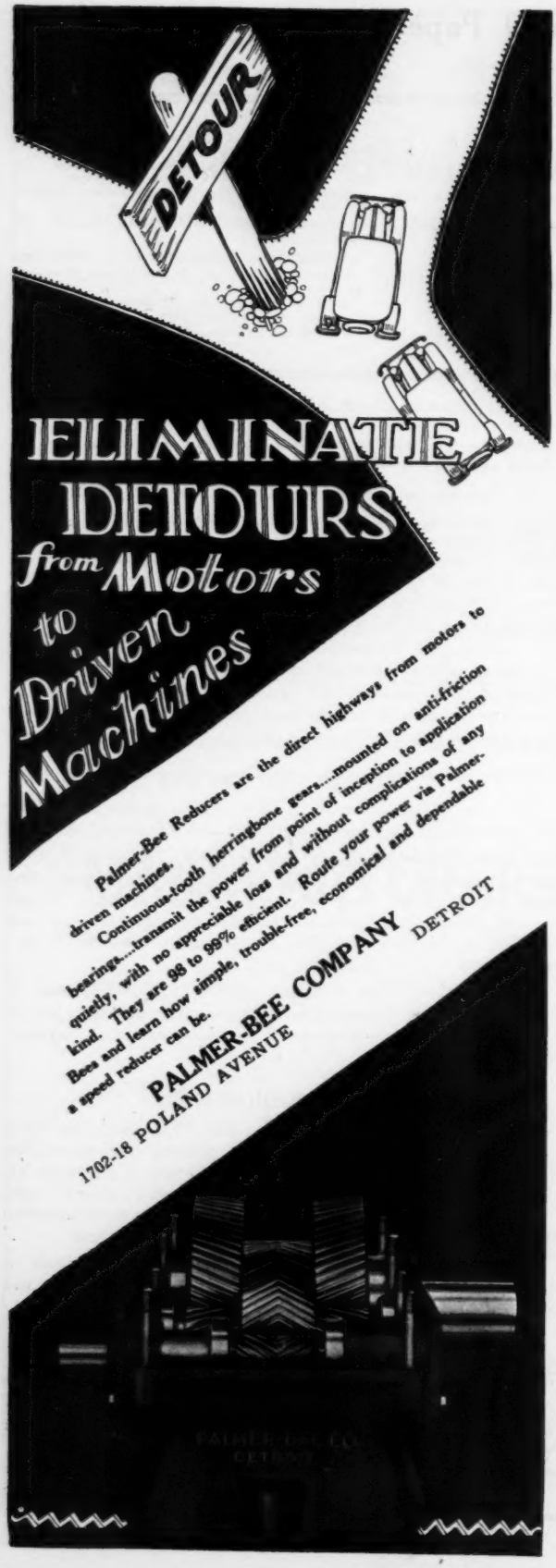
The C. C. Stewart Paper Company, Inc., Philadelphia, has taken larger quarters at 1015 Chestnut street, moving from room 1326 to room 1200 of the Jefferson Building, where it maintains an organization that does consulting work for manufacturers who retain its services, such as converters and paper manufacturers. The company advises as to the proper kind of paper to use.

Mr. Stewart has had upwards of twelve years' experience in paper mills from machine tender to general superintendent, and knows the field from the bottom up.

MORART PAPER CO. EXPANDS

[FROM OUR REGULAR CORRESPONDENT]

HOLYOKE, Mass., February 18.—The Morart Paper Company is placing contracts for machinery, fittings, etc., to double the present capacity of the plant. The company was organized in August, 1927, and is engaged in the manufacture of decorative and fancy papers for box coverings, envelope linings and other specialties. Maurice J. Moriarty is president, Charles H. Barr treasurer and Charles F. Moriarty secretary.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WE HAVE A
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They eliminate all guess work and are a guarantee that your product is just what you desire.

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WRITE FOR BOOKLET DESCRIBING DIFFERENT TESTING INSTRUMENTS

FOREIGN PAPER MILLS Inc.
72 Duane St.—New York

New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, February 20, 1929.

Conditions in the local paper market during the past week were seasonal. On the whole, the demand for the various grades of paper was fairly satisfactory and now that the spring campaign has been inaugurated, greater activity may be expected in the near future. Prices are generally holding to previously recorded levels, although there is a tendency to make concessions on extra desirable orders.

The news print situation is still uncertain. Statistics gathered by the News Print Service Bureau show that the total North American production for January amounted to 358,543 tons. The Canadian mills operated at 81.9 per cent of rated capacity, United States mills at 81.8 per cent and Newfoundland mills at 100.8 per cent. Stocks of news print paper on hand at the end of January totaled 59,409 tons, which was equivalent to 3.8 days' average production.

Demand for the various grades of paper board is satisfactory but the price situation is seriously affected by the apparent failure of the recent Washington conference to reach an agreement. The tone of the fine paper market is steady and tissues are in somewhat better request. There were no great changes in the position of the coarse paper market although wrapping paper is moving at a good pace.

Mechanical Pulp

The ground wood market is beginning to show signs of improvement and contract shipments are going forward in heavy volume. Production has been somewhat restricted by weather conditions and other causes, with the result that prices are generally holding to schedule and shading is infrequent.

Chemical Pulp

Steadiness prevails in the chemical pulp market. Producers are well sold ahead on most of the various grades. Both imported and domestic bleached sulphite are exceptionally firm. Inquiries for future business are fairly numerous. Prices continue steady and there is little talk of concessions around at present.

Old Rope and Bagging

Mill interest in domestic and foreign old rope is becoming more general. Demand for Manila No. 1 is quite persistent. Prices remain unaltered. Most of the business transacted in the bagging market during the past week was along routine lines. Accumulations are reported to be not excessive and prices rule steady to firm.

Rags

The domestic rag market is exhibiting a strong undertone. Cotton cuttings are still in persistent request and more interest is being displayed in some quarters in roofing grades. Prices are generally holding to former levels. The foreign rag market is rather quiet at present with prices ruling fairly steady.

Waste Paper

Influenced by a strong demand from the board mills, the lower grades of paper stock are steady to firm. Book stock continues fairly active and there is an improved request for old kraft machine compressed bales. The volume of inquiries in the market is satisfactory for the time of year and the outlook for the future is promising.

Twine

Most of the business transacted in the twine market during the past week was along routine lines. Now that the spring shopping season is approaching, however, a revival of business is generally anticipated. Although some slight fluctuations have been reported, the schedule of prices is being well maintained in most instances.

CONDITIONS IN THE INDUSTRY

[FROM OUR REGULAR CORRESPONDENT]

POTSDAM, N. Y., February 11, 1929.—In an address before the Chamber of Commerce of this place during the past week Robert J. Buck discussed general conditions in the industry and stressed reforestation as the great problem and need of this section. He told his audience that the wealth of the several north counties could be increased many times with a concerted co-operative effort toward intensive reforestation and use of the present undeveloped water power. His address in part follows:

"As the result of the extremely active lumbering operations of the earlier days land formerly covered with trees has been cleared and we now have in the North Country one of the richest farming sections of the world. So far as our industrial life is concerned even though the news print industry, for which we have been especially famous during the last decade, has passed to a foreign land we are still tremendously active as an industrial center. Mills and factories producing a great diversity of products are operating successfully. If you will study the map carefully you will see that Potsdam enjoys a most advantageous and central location in this section. Looking to power development that is sure to be made at no very distant date in the St. Lawrence River I do not pretend to say what this will mean but when that development is made it is bound to add millions to the wealth of this particular locality.

"I can not let this opportunity pass without paying a tribute to one man who has had more to do than any other with the development of water power resources of the North Country. Floyd L. Carlisle, president of the St. Regis Paper Company, is entitled to the greatest credit for his discerning vision of our undeveloped wealth in water powers and for the courage and genius which he has displayed in what has already been done to develop and utilize this great asset. This development program is far from completion. We now know from what has been done that it is not only practicable but very profitable to develop our water power and I believe that we should all co-operate along every line to get the best possible results in the development of the wealth that still lies in our water power resources."

INSTALL NEW BEATER EQUIPMENT

The Columbia Paper Mills, of Vancouver, Wash., is installing new beater equipment under the personal supervision of C. E. Roberson, of the Noble & Wood Machine Company, Hoosick Falls, N. Y. This equipment is of the new Noble & Wood High Density type, of 5,000 pounds capacity, which, it is claimed, will hydrate stock of unusually high density in a very short time. It also has new features which facilitate furnish and dump and speed up operation. The new equipment will be used in the production of kraft paper.

PARSONS PAPER COMPANY

Established 1853
HOLYOKE, MASS.

PARSONS

HIGH GRADE LEDGERS, BONDS AND LINENS

Parsons Scotch Linen Ledger
Parsons Defendum Ledger
Parsons Mercantile Record
Parsons Bond
Parsons Parchment Deed
Parsons Linen
Parsons Old Hampden Bond
Parsons Mercantile Bond
Parsons Iroquois Bond
Parsons Gothic Bond
Parchment Bristol

ARTESIAN BOND **a rag-content, loft-dried, hand-sorted bond, of unusual brilliancy of color.**

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ARTESIAN BOND is made at Stevens Point, Wis., by

WHITING-PLOVER PAPER COMPANY

W-P

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, February 20, 1929.

BLANC FIXE.—Trading in the blanc fixe market was moderately active during the past week. Prices are being maintained at previously quoted levels. The pulp is selling at from $42.50 to $45.00 per ton, while the powder is offered at from 3¼ cents to 4½ cents per pound, in barrels, at works.

BLEACHING POWDER.—The bleaching powder market is practically unchanged. Contract shipments continue to go forward in normal manner. Inquiries for future business are fairly numerous. Prices remain unaltered. Bleaching powder is quoted at from $2.00 to $2.35 per 100 pounds, in large drums, at works.

CASEIN.—There were no radical changes reported in the casein market. The recently advanced prices are being maintained. Domestic casein is quoted at from 16 cents to 16½ cents per pound, standard ground imported at 16 cents, and finely ground at 16½ cents per pound, all in bags, car lot quantities.

CAUSTIC SODA.—Steadiness prevails in the caustic soda market. Supplies are moving into consumption in heavy volume. Prices remain unchanged. Solid caustic soda is quoted at from $2.90 to $2.95, while the flake and the ground is selling at from $3.30 to $3.35 per 100 pounds, in large drums, at works.

CHINA CLAY.—The china clay market was moderately active during the past week. The contract movement is well up to average. Prices remain unaltered. Imported china clay is quoted at from $15 to $25 per ton, ship side, while domestic paper making clay is still selling at from $8 to $13 per ton, at mine.

CHLORINE.—Demand for chlorine is seasonal. Contract shipments are going forward in satisfactory volume. Prices are generally holding to schedule. Chlorine is quoted at 3 cents per pound, in tanks, or multi-unit cars, at works, on standard contracts. The spot quotation ranges from 3¼ cents to 3½ cents per pound.

ROSIN.—The rosin market was moderately active. At the naval stores, the grades of gum rosin used in the paper mills are now quoted at from $8.95 to $9.30 per 280 pounds, ex dock, in barrels. Wood rosin is still selling at from $7.40 to $2.80 per 280 pounds, in barrels, at southern shipping points.

SALT CAKE.—Offerings of salt cake are somewhat limited at present and the market is decidedly firm. Inquiries for future business are numerous. Prices are holding to schedule. Salt cake is quoted at from $16 to $18 per ton, while chrome salt cake is selling at from $14 to $15 per ton, in bulk, at works.

SODA ASH.—Production of soda ash is being maintained in sufficient volume to take care of current requirements. Withdrawals against contract are normal. Prices remain unchanged. Contract quotations on soda ash, in car lots, at works, per 100 pounds, are as follows: in bags, $1.32½, and in barrels, $1.55.

STARCH.—The starch market is in a sound position. Demand for this product from the paper mills is persistent and the contract movement is satisfactory for the time of year. Prices are steady. Special paper making starch is quoted at $3.82 per 100 pounds, in bags, and at $3.99 per 100 pounds, in barrels, at works.

SULPHATE OF ALUMINA.—Conditions in the sulphate of alumina market are little changed. Supplies are moving into consumption in heavy volume. Prices are unaltered. Commercial grades of sulphate of alumina are quoted at from $1.40 to $1.55 and iron free at from $1.95 to $2.05 per 10 0pounds, in bags, at works.

SULPHUR.—The sulphur market is exhibiting a strong undertone. Prices are holding to schedule. Sulphur is quoted at $18 per ton, at mine, in lots of 1,000 tons, or over, on yearly contracts, and at $20 per ton for any smaller quantity over that period. On spot and nearby car loads, the quotation is $21 per ton.

TALC.—Normal conditions prevail in the talc market. Demand for this product is mostly routine. Prices are holding to former levels without difficulty. Domestic talc is quoted at from $16 to $18 per ton, at eastern mines, while imported talc is still selling at from $18 to $20 per ton, ship side.

Market Quotations

Paper

(F. o. b. Mill)

Ledgers	11.00	@38.00
Bonds	9.00	@45.00
Writings—		
Extra Superfine	14.00	@32.00
Superfine	14.00	@32.00
Tub sized	10.00	@15.00
Engine sized	8.00	@11.00
News—		
Rolls, contract	Nominal	
Rolls, transient	Nominal	
Sheets	Nominal	
Side Runs	Nominal	
Book, Cased—		
S. & S. C.	6.00	@ 7.50
M. F.	5.75	@ 7.00
Coated and Enamel	7.50	@12.00
Lithograph	7.50	@12.00
Tissues—Per Ream—		
White No. 1	.75	@ 1.00
Anti-Tarnish	1.35	@ 1.90
Colored	1.00	@ 2.00
White No. 2	.75	@ .80
Kraft	1.00	@ 1.10
Manila	.75	@ .80
Kraft—		
No. 1 Domestic	6.25	@ 6.50
No. 2 Domestic	4.00	@ 4.25
Southern	3.75	@ 4.00
Imported	6.50	@ 7.00
Manila—		
No. 1 Jute	9.00	@ 9.25
No. 2 Jute	7.75	@ 8.50
No. 1 Wood	4.75	@ 5.25
No. 2 Wood	4.00	@ 4.50
Butchers	3.75	@ 4.25
Fibre Papers—		
No. 1 Fibre	5.00	@ 5.50
No. 2 Fibre	4.75	@ 5.25
Common Bogus	2.75	@ 3.00
Screenings	3.00	@ 3.25
Card Middles	4.00	@ 5.00
Glassine—		
Bleached, basis 25 lbs.	13.00	@16.00
Bleached, basis 20 lbs.	15.00	@16.00

(Delivered New York)

Boards—per ton—		
News	32.50	@40.00
Straw	52.50	@55.00
Chip	30.00	@37.50
Binders' Boards	65.00	@67.50
Sgl. Mla. Ll. Chip	47.50	@52.50
Wood Pulp	80.00	@85.00
Container	52.50	@55.00
85 Test Jute Liner	52.50	@55.00

Mechanical Pulp

(Ex-Dock)

No. 1 Imported—		
Moist	28.00	@31.25
Dry	32.00	@34.00

(F. o. b. Mill)

No. 1 Domestic	26.00	@29.00
Screenings	15.00	@20.00

Chemical Pulp

(Ex-Dock, Atlantic Ports)

Sulphite (Imported)—		
Bleached	3.65	@ 4.40
Easy Bleaching	2.75	@ 2.90
No. 1 strong unbleached	2.50	@ 2.80
Mitscherlich unbleached	2.55	@ 3.25
No. 2 strong unbleached	2.40	@ 2.50
No. 1 Kraft	2.50	@ 2.75
No. 2 Kraft	2.40	@ 2.50
Sulphate—		
Bleached	3.75	@ 3.85

(F. o. b. Pulp Mill)

Sulphite (Domestic)—		
Bleached	3.40	@ 4.75
Easy Bleaching Sulphite	2.60	@ 2.75
News Sulphite	2.40	@ 2.50
Mitscherlich	3.00	@ 3.25
Kraft (Domestic)	2.50	@ 3.30
Soda Bleached	3.15	@ 3.30
Sulphate Screenings—		
Coarse	.75	@ .95
Refined	1.50	@ 1.65

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—		
New White, No. 1	11.00	@11.50
New White, No. 2	8.00	@ 8.50
Silesias No. 1	7 25	@ 7.75
New Unbleached	11.00	@11.50
Washables	4.25	@ 4.75
Fancy	5.50	@ 6.00
Blue Overall	6.75	@ 7.25
New Blue Prints	5.25	@ 5.50
New Soft Blacks	5.25	@ 5.75
Mixed Khaki Cuttings	4.75	@ 5.25
Pink Corset Cuttings	8.00	@ 8.50
O. D. Khaki Cuttings	5.25	@ 5.75
Men's Corduroy	3.75	@ 4.25
New Mixed Blacks	3.50	@ 3.75

Old Rags

White, No. 1—		
Repacked	5.50	@ 6.00
Miscellaneous	4.50	@ 5.00
White, No. 2—		
Repacked	3.00	@ 3.50
Miscellaneous	2.50	@ 2.75
St. Soiled, White	2.00	@ 2.15
Thirds and Blues—		
Repacked	2.25	@ 2.50
Miscellaneous	1.75	@ 2.00
Black Stockings	3.25	@ 3.75
Roofing Rags—		
Cloth Strippings	1.70	@ 1.80
No. 1	1.70	@ 1.80
No. 2	1.55	@ 1.65
No. 3	1.30	@ 1.40
No. 4	1.25	@ 1.35
No. 5A	.95	@ 1.05

Foreign Rags

New Rags

New White Cuttings	10.50	@11.50
Unbleached Cuttings	10.00	@11.00
Light Flannelettes	7.50	@ 8.00
New Light Silesias	7.00	@ 7.50
New Light Oxfords	7.00	@ 7.50
New Light Prints	5.50	@ 6.50
New Mixed Cuttings	2.75	@ 3.25
New Dark Cuttings	2.50	@ 3.00

Old Rags

No. 1 White Linens	7.25	@ 8.00
No. 2 White Linens	5.50	@ 6.25
No. 3 White Linens	4.50	@ 5.00
No. 4 White Linens	3.00	@ 3.50
No. 1 White Cotton	5.50	@ 6.50
No. 2 White Cotton	4.50	@ 5.50
No. 3 White Cotton	3.00	@ 4.00
No. 4 White Cotton	1.90	@ 2.15
Extra Light Prints	2.75	@ 3.25
Ord. Light Prints	2.25	@ 2.50
Med. Light Prints	1.90	@ 2.10
Dutch Blue Cottons	2.15	@ 2.30
French Blue Linens	2.65	@ 2.75
French Blue Cottons	2.10	@ 2.25
German Blue Linens	2.35	@ 2.55
German Blue Cottons	2.10	@ 2.20
Checks and Blues	1.80	@ 1.90
Lindsay Garments	1.80	@ 1.85
Dark Cottons	1.60	@ 1.65
Old Shopperies	1.50	@ 1.55
New Shopperies	1.50	@ 1.60

Old Rope and Bagging

(Prices to Mill f. o. b. N. Y.)

Gunny No. 1—		
Foreign	1.60	@ 1.70
Domestic	1.70	@ 1.75
Wool Tares, light	1.60	@ 1.65
Wool Tares, heavy	1.60	@ 1.70
Bright Bagging	1.60	@ 1.65
Small Mixed Rope	1.25	@ 1.40
Manila Rope—		
Foreign	3.35	@ 3.65
Domestic	3.25	@ 4.00
New Burlap Cut	2.75	@ 3.00
Hessian Jute Threads—		
Foreign	3.50	@ 4.00
Domestic	3.25	@ 3.50

Old Waste Papers

(F. o. b. New York)

Shavings—		
Hard, white, No. 1	3.25	@ 3.50
Hard, white, No. 2	2.40	@ 2.55
Soft, White, No. 1	2.50	@ 2.60
White envelope cuttings	3.25	@ 3.50
Flat Stock—		
Stitchless	1.70	@ 1.80
Overissue Mag.	1.70	@ 1.80
Solid Flat Book	1.65	@ 1.75
Crumpled No. 1	1.15	@ 1.25
Solid Book Ledger	2.00	@ 2.10
Ledger Stock	1.70	@ 1.80
New B. B. Chips	.65	@ .75
New Env. Cut	2.40	@ 2.60
Manilas—		
New Cuttings	1.60	@ 1.85
Extra No. 1 old	1.25	@ 1.35
Print	.75	@ .80
Container	.60	@ .65
Bogus Wrapper	.75	@ .85
Old Kraft Machine Compressed bales	1.75	@ 1.85
News—		
No. 1 White News	1.70	@ 1.75
Strictly Overissue	.85	@ .95
Strictly Folded	.65	@ .70
No. 1 Mixed Paper	.45	@ .50
Common Paper	.30	@ .35

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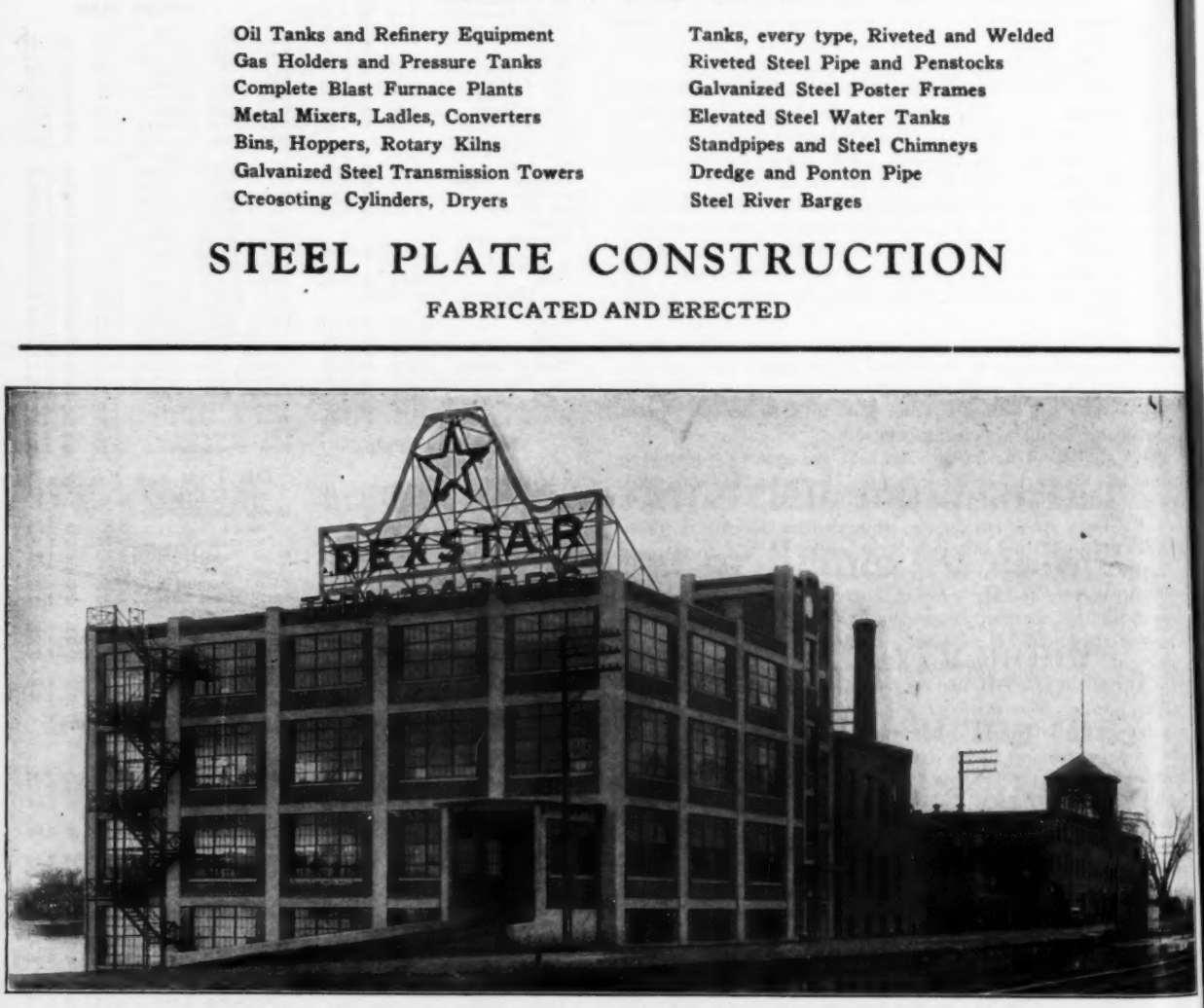

C. H. DEXTER & SONS, Inc., Windsor Locks, Conn.

Highest Grade Thin Papers

Twines

(F. o. b. Mill)

Cotton—			
No. 1	.39	@	.40
No. 2	.37	@	.38
No. 3	.36	@	.37
B. C., 18 basis	.38	@	.40
A. B. Italian, 18 basis	.48	@	.53
Finished Jute—			
Dark 18 basis	.24	@	.25
Light 18 basis	.27	@	.28
Jute Wrapping, 3-6 Ply—			
No. 1	.19	@	.21
No. 2	.18	@	.20
Tube Rope—			
4-ply and larger	.16	@	.17
Fine Tube Yarn—			
5-ply and larger	.21	@	.23
4-ply	.25	@	.29
3-ply	.28	@	.32
Unfinished India—			
Basis	.13	@	.14
Paper Makers Twine Balls	.11	@	.12
Box Twine, 2-3 ply	.15	@	.17
Jute Rope	.17	@	.19
Amer. Hemp, 6	.29	@	.31
Sisal Hay Rope—			
No. 1 Basis	.16	@	.18
No. 2 Basis	.14	@	.16
Sisal Lath Yarn—			
No. 1	.14	@	.16
No. 2	.12	@	.14
Manila Rope	.22	@	.24

CHICAGO

All Rag Bond	.35	@	.41
No. 1 Rag Bond	.25	@	.35
No. 2 Rag Bond	.14	@	.25
Water Marked Sulphite Bond	.09	@	.12
Sulphite Bond	.06¼	@	.11
Superfine writing	.18	@	.24
No. 1 fine writing	.14	@	.18
No. 2 fine writing	.12	@	.14
No. 3 fine writing	.08½	@	.12
No. 1 M. F. Book	.06½	@	.07¼
No. 2 M. F. Book	.05¼	@	.06¼
No. 1 S.&S.C. Book	.06¼	@	.07¼
No. 2 S.&S.C. Book	.05¼	@	.06½
Coated Book	.07½	@	.12
Coated Label	.07½	@	.10
News—Roll, mill	.03½	@	.04¼
News—Sheets, mill	.03¼	@	.04¼
No. 1 Manila	.04¼	@	.05¼
No. 1 Vibre	.04¼	@	.05¼
No. 2 Manila	.04¼	@	.04¼
Butcher's Manila	.04	@	.04½
No. 1 Kraft	.06¼	@	.06½
Southern Kraft	.03¼	@	.04
No. 2 Kraft	.04	@	.04¼
Wood Pag Boards	.04¼	@	.06¼
Sulphite Screenings	.03	@	03¼
Manila Tissue—			
24x36 Sheet	.07	@	.07¼
White Tissue—			
20x30 Sheet	.07¼	@	.07½
Boards, per ton— (Delivered Central Territory)			
Plain Chip	37.50	@	41.00
Solid News	47.50	@	—
Manila Lined Chip	55.00	@	—
Container Lined— (Delivered Central Territory)			
85 Test	65.00	@	70.00
100 Test	70.00	@	—

Old Papers

(F. o. b. Chicago)

Shavings—			
No. 1 Hard White	2.35	@	2.45
White Env. Cuttings	2.50	@	2.55
No. 1 Soft Shavings	2.10	@	2.15
No. 1 Mixed	1.00	@	1.05
No. 2 Mixed	.80	@	.85
Ledger & Writings	1.55	@	1.65
Solid Books	1.40	@	1.50
Blanks	1.50	@	1.65
Krafts	1.70	@	2.00
New Kraft Cuts	2.30	@	2.35
Manila Envelope Cuttings	1.75	@	1.90
Ex. No. 1 Manila	1.40	@	1.50
Print Manila	.85	@	.90
Folded News (overissue)	.70	@	.80
Old Newspapers—			
No. 1	.75	@	.80
No. 2	.65	@	.70
Mixed Papers—			
No. 1	.65	@	.70
Roofing Stocks— (F. o. b. Chicago, net cash)			
No. 1	30.00	@	—
No. 2	28.00	@	—

PHILADELPHIA

Paper

(F. o. b. Mill)

Bonds	.06	@	.40
Ledgers	.10	@	.40
Writings—			
Superfine	.13	@	.18
Extra fine	.20	@	.22
Fine	.18	@	.26½
Fine, No. 2	.15	@	.25
Fine, No. 3	.10	@	.20
Book, M. F.	.06	@	.07
Book, S. S. & C.	.06	@	.07½
Book, Coated	.10	@	.16
Coated Lithograph	.07	@	.11
Label	.07	@	.11
News	.03½	@	.04
No. 1 Jute Manila	.08½	@	.09
Manila Sul., No. 1	.04½	@	.05½
Manila No. 2	.03¼	@	.04
No. 2 Kraft	.06	@	.06½
No. 1 Kraft	.06½	@	.07
Common Bogus	.03	@	.03½
Straw Board	52.50	@	75.00
News Board	35.00	@	38.00
Chip Board	30.00	@	38.00
Wood Pulp Board	85.00	@	95.00
(Carload Lots)			
Binder Boards—			
No. 1, per ton	75.00		
No. 2, per ton	70.00		
Carload lots	68.00	@	70.00
Tarred Felts—			
Regular	53.00	@	55.00
Slaters (per roll)	84	@	.94
Best Tarred, 1-ply (per roll)	1.85	@	1.93
Best Tarred, 2-ply (per roll)	1.44	@	1.54
Best Tarred, 3-ply	1.93	@	2.08

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1	.10½	@	.11
New White, No. 2	.07	@	.07¼
Light Silesias	.07	@	.07½
Silesias, No. 1	.08½	@	.09
Black Silesia, soft	.05	@	.05¼
New Unbleached	.10½	@	.11
Washable, No. 1	.04½	@	.05
Blue Overall	.07½	@	.08
Fancy			
Cottons—According to grades—			
Washable, No. 2	.03	@	—
New Blue	.03	@	.03½
New Black Soft	.05	@	.05¼
New Light Seconds	.02½	@	.03
New Dark Seconds	1.85	@	2.00
Khaki Cuttings—			
No. 1 O. D.	.05½	@	.05¾
No. 2 Mixed	.04½	@	.04¾
Corduroy	.03	@	.03½
New Canvas	.08½	@	.09
New Black Mixed	.03¾	@	.04½

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	1.50	@	1.60
Domestic	1.75	@	—
Manila Rope	3.50	@	4.00
Sisal Rope	1.50	@	—
Mixed Rope	1.10	@	1.25
Scrap Burlaps—			
No. 1	1.50	@	1.60
No. 2	1.10	@	1.20
Wool Tares, heavy	3.00	@	—
Mixed Strings	1.15	@	1.25
No. 1, New Light Burlap	2.50	@	2.75
New Burlap Cuttings	2.00	@	2.25

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	3.20	@	3.25
No. 2 Hard White	2.75	@	3.00
No. 1 Soft White	2.50	@	2.60
No. 2 Soft White	1.90	@	2.00
No. 1 Mixed	1.50	@	1.60
No. 2 Mixed	.90	@	1.00
Solid Ledger Stock	1.85	@	1.90
Writing Paper	1.60	@	1.65
No. 1 Books, heavy	1.45	@	1.55
No. 2 Books, light	1.20	@	1.25
No. 1 New Manila	2.40	@	2.50
No. 1 Old Manila	1.50	@	1.60
Print Manila	.95	@	1.00
Container Manila	.85	@	.90
Old Kraft	2.25	@	2.50
Common Paper	.55	@	.60
No. 1 Mixed Paper	.70	@	75
Straw Board, Chip	.70	@	75
Binders Board, Chip	.70	@	.75
Overissue News	.85	@	.90
Old Newspaper	.70	@	—

Domestic Rags (Old)

White, No. 1—			
Repacked	4.25	@	4.50
Miscellaneous	3.50	@	3.75
White, No. 2—			
Thirds and Blues—			
Repacked	2.00	@	2.25
Miscellaneous	1.60	@	1.80
Black Stockings (Export)	3.90	@	4.25
Roofing Stock—			
Foreign No. 1	1.65	@	1.75
Repacked	.02½	@	.02¾
No. 2	1.30	@	1.35
No. 3 (Roofing)	1.15	@	1.25
No. 4	1.00	@	1.15
No. 5A	.75	@	.85
B	.65	@	.75
C	.65	@	.75

BOSTON

Paper

(F. o. b. Mill)

Ledgers—			
Sulphite	.07½	@	.15
Rag content	.15	@	.30
All rag	.38	@	.52½
Bonds—			
Sulphite	.06½	@	.11½
Rag content	.15	@	.30
All rag	.36½	@	.65
Writings	.07	@	.20
Superfines	.11	@	.31
News	.03½	@	.04
Book, Super	.06	@	.09
Book, M. F.	.05¾	@	.08½
Book, Coated	.08½	@	.20
Coated Litho	.09	@	.12
Label	.09½	@	.15
Jute Manila No. 1	.11	@	.13
Manila, Sul. No. 1	.04¾	@	.06½
Manila, Sul. No. 2	.03¾	@	.04½
No. 1 Kraft	.05½	@	.06½
No. 2 Kraft	.03¾	@	.04½
Common Bogus	.02	@	.02¾
Delivered New England points			
Straw Boards, rolls .009			$2.50
Straw Board in Sheets, basis 35s to 70s	54.50	@	55.00
Filled News Board	37.50	@	40.00
Chip Board	35.00	@	37.50
Single Manila Lined Chip	47.50	@	50.00
Single White, Patent Coated Newsboard			
Bender	67.50	@	80.00
Wood Pulp Board	80.00	@	85.00
Binder Boards	70.00	@	75.00
(F. o. b. Mill)			
Tarred Felts—			
Regular, carload lots	65.00	@	—

Old Papers

(F. o. b. Boston)

Shavings—			
No. 1 Hard White	3.25	@	3.75
No. 2 Hard White	2.60	@	2.90
No. 1 Soft White	2.50	@	2.60
No. 1 Mixed	1.10	@	1.15
No. 2 Mixed	.85	@	.90
Solid Ledger Stock	2.35	@	2.45
No. 1 Books, Heavy	1.50	@	1.60
No. 1 Books, Light	—	@	1.15
Manila Env. Cuttings	2.00	@	2.25
No. 1 Old Manila	1.15	@	1.20
White Blank News	1.60	@	1.65
Old Kraft	1.85	@	1.90
Print Manila	.80	@	.90
No. 1 Mixed Paper	.50	@	.55
Overissue News	.70	@	.85
Old Newspapers	.65	@	.67½
Box Board, Chip	.55	@	.60

Bagging

(F. o. b. Boston)

Gunny No. 1—			
Foreign	—	@	1.60
Manila Rope—			
Foreign	3.60	@	3.75
Domestic	4.00	@	—
Mixed Strings	.90	@	1.00
Jute Wool Strings	—	@	1.00
Scrap Burlaps	1.25	@	1.35
Scrap Sisal	1.60	@	1.80
Scrap Sisal for anreading	1.75	@	2.00
Wool Tares, heavy	—	@	1.50
New Burlap Cutting	1.90	@	2.00
Australian Wool Pouches	2.75	@	3.00

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New White No. 1	.09½	@	.10
Silesias, No. 1	.06	@	.06¼
New Unbleached	.11	@	.11½
Fancy	.06	@	.06½
Washable	.04	@	.04½
Cottons—According to grades			
Blue Overalls	.07¾	@	—
New Black, soft	.04	@	.04¼
Khaki Cuttings	.04	@	.04½
O. D. Khaki	.05½	@	.05¾
Corduroy	.03	@	.03½
New Canvas	.08	@	.08¼

Domestic Rags (Old)

(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	4.75	@	5.25
Miscellaneous	5.00	@	—
White No. 2—			
Repacked	.04½	@	.05
Miscellaneous	.03½	@	.04
Twos and Blues	2.85	@	3.00
Thirds and Blues—			
Repacked	2.75	@	2.90
Miscellaneous	2.75	@	2.90
Roofing Stock—			
No. 1	1.65	@	1.75
No. 2	1.45	@	1.55
No. 3	1.05	@	1.10
No. 4	1.10	@	1.15

Foreign Rags

(F. o. b. Boston)

Dark Cottons	—	@	1.55
New No. 1 Shirt Cuttings	9.00	@	10.00
Dutch Blues	2.00	@	2.12½
Lace Curtains	5.10	@	5.50
New Checks & Blues	4.25	@	4.50
Old Fustians	1.90	@	—
Old Linsey Garments	1.75	@	1.80

TORONTO

Paper

(F. o. b. Mill)

Bond—			
No. 1 Sulphite	.12½	@	—
No. 2 Sulphite	.10¾	@	—
No. 1 Colored	.13½	@	—
No. 2 Colored	.11¾	@	—
Ledgers (sulphite)	—	@	—
Ledgers, No. 1	.36	@	—
Ledgers, No. 2	.27	@	—
Writing	.09½	@	.10
News f. o. b. Mills—			
Rolls (carloads)	3.25	@	—
Sheets (carloads)	3.75	@	—
Sheets (2 tons or over)	4.00	@	—
Book—			
No. 1 M. F. (carloads)	7.50	@	—
No. 2 M. F. (carloads)	7.25	@	—
No. 3 M. F. (carloads)	7.00	@	—
No. 1 S. C. (carloads)	8.00	@	—
No. 2 S. C. (carloads)	7.75	@	—
No. 3 S. C. (carloads)	7.50	@	—
No. 1 Coated and Litho	13.25	@	—
No. 2 Coated and Litho	12.25	@	—
No. 3 Coated and Litho	11.50	@	—
Coated tinted	14.50	@	—
Wrapping—			
Rag Brown	4.95	@	—
White Wrap	5.25	@	—
"B" Manila	5.80	@	—
No. 1 Manila	6.65	@	—
Fiber	6.65	@	—
Kraft, M. F.	7.00	@	—
M. G.	7.00	@	—

Pulp

(F. o. b. Mill)

Ground Wood	30.00	@	31.00
Sulphite easy bleaching	62.00	@	—
Sulphite news grade	62.00	@	—
Sulphite, bleached	75.00	@	—
Sulphate	65.00	@	—

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	3.00	@	—
Soft White Book Shavings	2.85	@	—
White Blk. News	1.60	@	—
Book and Ledger—			
Flat Magazine and Book Stock (old)	1.40	@	—
Light and Crumpled Book Stock	1.25	@	—
Ledgers and Writings	1.50	@	—
Solid Ledgers	1.50	@	—
Manilas—			
New Manila Cut	1.50	@	—
Printed Manilas	1.00	@	—
Kraft	2.25	@	—
News and Scrap—			
Strictly Overissue	.80	@	—
Strictly Folded	.80	@	—
No. 1 Mixed Paper	.70	@	—

Domestic Rags

(Price to mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.11½	@	—
Fancy Shirt Cuttings	.05¼	@	—

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Acid Proof Vitrified Tile
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Sulphite
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Chemical Pulp Mill Engineers

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Paper Mill Stocks and Bonds

Quoted by Taylor & White, 45 Wall street, New York City, to whom all inquiry for quotations on these or any other Securities is referred.

BONDS	BID	ASKED
Abitibi Power & Paper 5s, 1943	90	91
Abitibi Power & Paper 6s, serially to 1934	100	102
American Writing Paper 6s, 1947	81	87
Bastrop Pulp & Paper 6½s, 1940	103	105½
Bedford Pulp & Paper 6½s, 1942	97	100
Belgo-Canadian Paper 6s, 1943	100	103
British-Columbia Pulp & Paper 6s, 1950	89	92
Brown Paper Mills Serial 6s, 1941	97	100
Brown Company 5½s, 1946	98	101
Bryant Paper 6s, 1942	98	101½
Canadian Paper Board 7s, 19337	97	99½
Cape Breton Pulp & Paper 6s, 1932	103	...
Celotex Company 6s, 1929	95	99
Celotex Company 6½s, 1939	100	102
Celotex Company of Chicago, Debenture 6s, 1936	95	98
Central Paper Company Serial 6½s, 1942	86	89
Central Paper 7s, 1934	78	...
Champion Coated Paper Serial 6½s, 1934	100	...
Champion Coated Fibre Notes 6s, 1941	100	102
Champion Fibre Notes 6s, 1941	100	102
Champion Fibre Notes 8s, 1930	95	...
Champion Paper Corp. 6s, 1945	95	98
Container Corp. of America Debenture 6s, 1936, ex-warrants	101	104
Continental Paper Products 6½s, 1943	90	99
Cornell Wood Products 7½s, 1937	103	...
Crown Willamette 6s, 1951	101	102
Della Paper & Pulp Serial 6s, 1938	95	98
Dixon Board Mills Serial 6s, 1942	80	...
Donnaconna Paper 5½s, 1948	93	...
Eastern Manufacturing Co. 7s, 1938	97	100
Escanaba Paper Serial 6s, 1939	98	100
Escanaba Paper 6½s, 1935	96	99
Filer Fibre Serial 7s, 1935	90	95
Fort Irange Paper 7s, 1942	101	...
Fort William Paper 6s, 1946	100	104
Fraser Company 6s, 1950	103	105
Hammermill Paper Serial 6s, 1939	100	...
Hawley Pulp & Lumber 6s, 1946	96	..
Hawthorne Paper Company 6s, 1937	80	...
Hoberg Paper & Fibre 7s, 1937	94	97
Industrial Fibre Corp. Debenture 8s, 1933	100	...
Itasca Paper & Prairie River Power Serial 5½s, 1938	99½	...
Itasca Paper & Prairie River Power Serial 6s, 1938	99	...
Jessup & Moore First 6s, 1945	83	90
Kalamazoo Vegetable Parchment 6s, 1938	99	101
Lake Superior Paper 6s, 1941	105	108
Marathon Paper Mills Serial 5½s, 1942	99	101
Marinette & Menominee 7½s, 1936	103	105
Mead Pulp & Paper 5% Notes Serially, 1937	95	100
Mead Fibre 7s, 1937	97	101
Minnesota Ontario Paper Serial 6s, 1945	97½	100
Murray Bay Paper Serial 6½s, 1947	102	105
Munissing Paper Serial 6s, 1936	98	...
Nekoosa Edwards Paper 6s, 1928-42	96	...
Ontario Pulp & Paper 6s, 1931	108½	110½
Orono Pulp & Paper 6s, 1943	99	...
Orono Pulp & Paper 5s, 1941	96½	...
Oswego Falls Corp. 6s, 1941	99	102
Parker-Young Company 6½s, 1944	98	100
Paterson Parchment Paper 6s, 1938	101	103
Penobscot Chemical Fibre 6s, 1942	102	105
Port Alfred Pulp & Paper 5½s, 1947	98	100
Price Brothers 6s, 1943	105	...
Provincial Paper 5½s, 1947	98½	...
Queen City Paper 7s, 1933	98	...
River Raisin Paper 6s, 1936	98	100
Riordan Pulp & Paper 6s, 1942	102	104
Rolland Paper 6s, 1937	99	101
St. Croix Paper Serial 5s, 1937	99	...
St. Helen Pulp & Paper 6½s, 1931	99	102
St. Maurice Valley Corp. 6s, 1945	101	104
St. Maurice Valley Corp. 5½s, 1947	98½	100½
St. Regis Paper of Canada 6s, 1931	100	101½
St. Regis Paper of Canada 6½s, 1934	100	102
Smith (Howard) Paper Mills 7s, 1941	104	106
Spanish River Pulp & Paper 6s, 1931	108	110
Stevens-Thompson Paper 6s, 1942	94	96
Taggart Brothers 6s, 1944	95	100
Tait Paper & Color Industries 6s, 1934	88	92
Ticonderoga Pulp & Paper 5s, 1930	94	...
Ticonderoga Pulp & Paper 6s, 1940	100	102
Tomahawk Kraft Paper 6s, 1938	98	...
Tomahawk Pulp Paper 7s, 1932	99	...
Tonawanda Paper 5½s, Series 1941	99	102
Union Bag & Paper Power 6s, 1932	98	100
United Wall Paper Factories 6s, 1947	96	99
Warren (S. D.) Company 6s, 1945	103	105
Watab Paper 6½s, 1942	102	...
Waterway Paper Products 6s, 1931	100	101½
Wayagamack Pulp & Paper 6s, 1951	103	105
Westfield River Paper Serial 7s, 1943	89	93
Whitmer-Parson Pulp & Lumber 8s, 1938	20	25
Whitaker Paper 7s, 1942	108	110

STOCKS	BID	ASKED
American Box Board, Pfd.	9¼	10¼
American Box Board, Com.	9¼	10¼
Am. Tissue Mills, 7% Pfd.	90	93
British Columbia P. & P. Pfd.	65	75
Brompton Pulp & Paper, 8% Pfd.	100	...
Champion Fibre, 7% Pfd.	108	110
Diem & Wing, 7% Pfd.	92	97
Eastern Mfg. Co. 1st Pfd.	85	...
Great Northern Paper, Com.	75	78
Hammermill Paper, new 6% Pfd.	100	...
Hinde & Dauch, Com.	125	None Off.
Hinde & Dauch, 6% Pfd.	102	None Off.
Holyoke Card & Paper	160	None Off.
Marathon Paper Mills, Com.	150	...
Mengel Co., Pfd.	102	104
Midwest Box Co., 8% Pfd.	98	102
Midwest Box Co., 6% Pfd.	95	99
Louis De Jonge Co., 7% Pfd.	94	97
Oxford Papers, Com.	195	...
Oxford Paper Co., Pfd.	108	111
Penobscot Chemical Fibre, Com.	80	...
Richardson Co., Com.	170	...
Sabin Robbins Paper Co., 8% Pfd.	105	110
St. Croix Paper	155	...
St. Regis Paper Co., 7% Cum. Pfd.	105	108
Westfield River Paper Co., 1st Pfd.	Wanted	None Off.
West Virginia Pulp and Paper Company	55	57
West Virginia Pulp and Paper, Pfd.	100	103
Whittaker Paper, 7% Cum. Pfd.	105	None Off.

TORONTO NOTES AND JOTTINGS

C. V. Syrett Paper Company, Ltd., Wellington street, Toronto, has increased its capital stock by letters patent, creating 1,000 common shares without nominal or par value.

E. G. Rolph, advertising manager for the Howard Smith Paper Mills, Ltd., Montreal, was in the city a few days ago on business.

Howard Smith Paper Mills, Ltd., have prepared and sent to the paper and printing trades a new edition of their Blue Book, which contains a specimen of each of the different grades of bonds, ledger and writing papers produced by the concern and showing the various colors and styles of finish. This supersedes the previous issue. It is to be noted that the weights of the standard substance numbers are expressed in pounds per thousand sheets. Much care and thought have been put into the preparation of the book.

C. J. Kay, of the Columbia Paper Company, Ltd., Vancouver, B. C., was in Toronto recently on his way to Europe on a combined business and pleasure trip. He will visit both the British and Continental centers.

Recent visitors from Toronto to the Detroit Sulphite Pulp and Paper Company, Detroit, were John Hewitt, Jr., president of Paper Sales, Ltd.; T. J. Allen, vice-president, and A. G. Allen, director. Paper Sales, Ltd., have recently been appointed sales agents for the Detroit concern.

The Buntin Reid Company, Ltd., Toronto, this week staged an exhibit of fine printing on Worthy Papers, brought to Toronto from the mill's library of specimens at Mittineague, Mass. The exhibit was in charge of Gorham Bliss, of the Worthy Paper Company, and included books, brochures, folders, broadsides, letterheads and greetings in great variety, and showing work of well-known presses. The latest in printing processes was displayed such as aquatone, water-color and interesting samples of half-tone and line work. The exhibit ranged from commercial pieces to the de lux edition.

Plans prepared by a Toronto architect are being followed by the Canadian International Paper Company, Ltd., in the construction of an acid tower being built at Temiskaming, Que.

S. Harvey Smith, of the Laurentide Company, Quebec, was a business visitor in Toronto during the last few days.

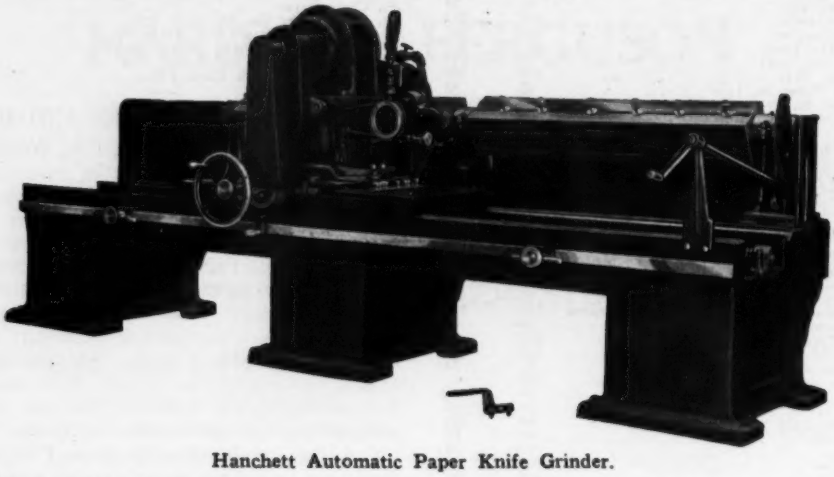
The Superior Paper Mills at Thorold, Ont., which have been idle for the past year, have been bought in by the bondholders and it is stated that a well known roofing company will utilize the plant. The Superior Paper Mills were started about three years ago for the manufacture of light weight papers but went out of business about a year ago.

FILES COMPLAINT ON COAL RATES

[FROM OUR REGULAR CORRESPONDENT]

THOMSON, N. Y., February 4, 1929.—The Iroquois Pulp and Paper Company, of this place, has filed a complaint with the Interstate Commerce Commission at Washington alleging that the firm is forced to pay a higher rate on bituminous coal from the Greenburg district of Pennsylvania than it does on the same kind of coal from the Clearfield district nearby. The complaint also charges that the existing discrimination against Greenburg coal favors competitiors in the paper manufacturing business in Glens Falls, Hudson Falls, Fort Edward, Corinth, Ticonderoga and Plattsburg. The commission is asked to remove the discrimination again Greenburg coal. In the complaint it is charged that the rate of Greenburg coal is about 35 cents higher than on Clearfield coal to all other mills in this section.

New Mammoth Traveling Cup Wheel Grinder



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FASTER & COOLER GRINDING

Widely used for grinding paper and chipper knives.
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for an important announcement of the greatest advance in Jordan engineering—an improvement that means tremendous operating advantages and great savings to every paper maker; the result of Bolton's 25 years of specialized experience plus that of The Emerson Manufacturing Company in building paper machinery since the early '80's.

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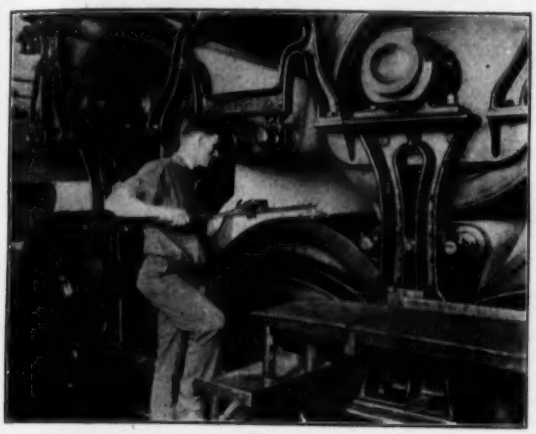

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PAPER TRADE JOURNAL

ESTABLISHED 1872

THE INTERNATIONAL WEEKLY OF THE PAPER AND PULP INDUSTRY AND THE PIONEER PUBLICATION IN ITS FIELD

FIFTY-SEVENTH YEAR

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Here are two special features of the Black-Clawson Spiral Bevel Gear Drive that should prove of interest to every paper maker.

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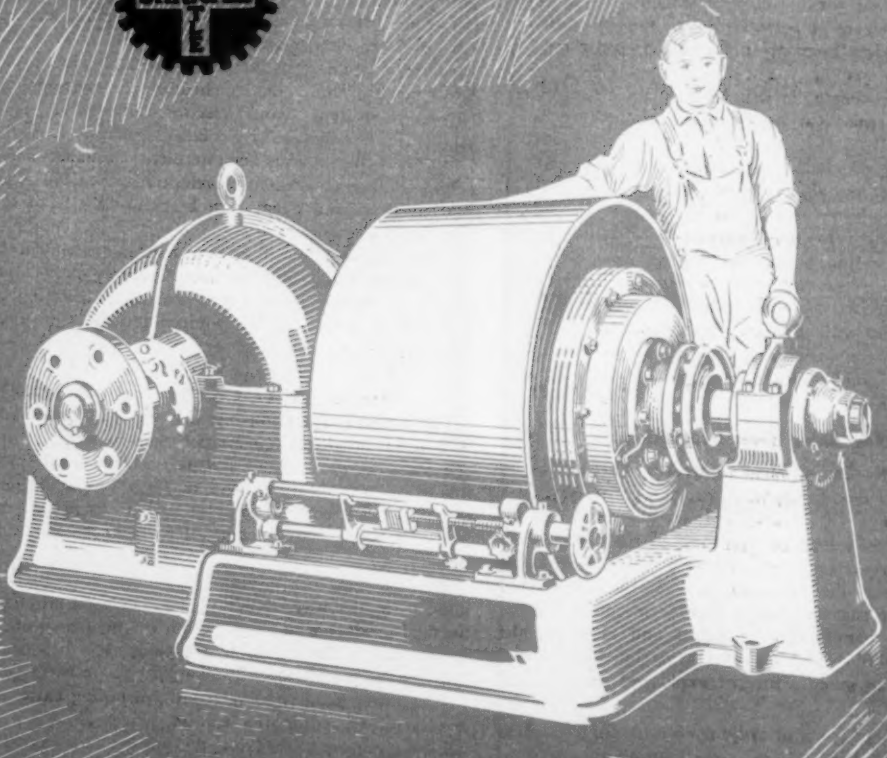
These, and other highly important Black-Clawson features, fully discussed in the February Messenger, a copy of which we would be glad to send you upon request.

SHARTLE



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